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FORESTS IN THE RUSSIAN WAR ZONE

By Stanley Washburn

Chief War Correspondent of the London Times in Russia

[Mr. Washburn wrote this article for American Forestry at the request of Mr. Charles Lathrop Pack, a director of the American Forestry Association and a close friend of the famous writer. Mr. Washburn's opinion is that the damage to forests in the war zone is not serious and that the number of trees destroyed by shell fire, cut down for trenches and otherwise used is but a small percentage of the standing timber.—Editor's Note.]

"IN THE first place it is difficult for me to write of forest conditions in a way that can be of any value to the readers of a forestry magazine, as I have none of the knowledge of a forester. The use of the forests has appealed to me only from its military side, and I am afraid that I can give but meagre information as to the nature of the growth in Poland and none at all of that in East Prussia.

"From what I have seen over here I am not of the opinion that the forests as a whole have suffered very severely save in isolated patches.

"The one thing, however, that has grieved me to see has been the destruction of beautiful avenues of trees in many different quarters. Poland as well as parts of Galicia has a fair number of main arteries of travel in the shape of roads. Nearly all of these are flanked by beautiful trees. I do not know exactly what they are but to me they resemble poplars. Some of them are 2 feet and better in diameter at the butt and from 60 to 75 feet in height. Some of these avenues strike one as almost as impressive as the avenue of cryptomeria at Nikko, Japan (the Nikaido). They look as though they had been standing for centuries. In many places where fighting has taken place these beautiful trees have been cut out at the very butt to give a field of fire. The main road running from Warsaw to Sochaczew and Lowiecz is such as I describe. I passed up and down this unusual highway many times in the early days of the Great War and never failed to admire its beauty.

"When the second invasion of Poland took place and the Blonie line was being fortified these lovely trees all came down for miles to clear the field of fire for both artillery, machine-gun and rifle fire. But when one considers that all huts and dwellings within the zone of fire must as a military necessity be leveled, of course the trees are accepted as a loss which must follow as a matter of course. The roads running through Brody toward Lwow, or as it is known in America, Lemburg, were similarly flanked with trees, whose huge columns now lie in the ditches along side the way.

"Poland, as you know, is well patched with timber, mostly spruce and fir. I should say though, with my duties as a War Correspondent ever uppermost, I have always been preoccupied to such an extent that I have never looked at the woods from any point of view than that of estimating its value as cover. The groves that flank, sometimes on both sides, the Bazura-Rawka position west of Warsaw have been of excellent service to us. Where possible

trenches have been dug on the military crests at the fringe of these patches, and traverses have been run up from the rear where the reserve trenches are completely out of sight of the enemy, and it is possible for soup kitchens, supplies and reinforcements to come into the approaches without being visible to the enemy. This of course gives a greater degree of safety to the men going forward and enables the first line troops to be relieved at intervals more frequent than when there are no approaches masked by trees.

"Incidentally trenches in or at the edge of timber can be covered over with timber roofing so there is the least possible difficulty in transporting material to the men. I have always observed the best trenches in the timber, barring the Blonie line, and where possible and the terrain permitting trenches are over here on the Russian western operations often constructed in the shadow of or near patches of timber. This is often impossible where the strategic points in the terrain happen to fall in open places as is frequently the case.

"Personally I believe that the portion of the forests actually used for the construction of military works is too small to seriously affect the total supply.

"Neither do I think that the destruction by shell fire is worth mentioning. I have observed in a dozen places this effect and the damage is surprisingly small, all things considered. The effect of shrapnel fire on forests is a mere flea bite. A shell bursting above the forest has no effect at all save where the shell case strikes and often that only lops off branches or dents the trunks, especially if the growth be a heavy one. A shell bursting in timber will, of course, destroy a number of trees in the immediate vicinity but as a matter of fact such bursts are rare, nearly all shrapnel bursting on time fuses above the tree tops. The few that burst on contact are almost certain to explode in the upper branches where their damage is small, usually resulting in only breaking off a few tops.

Photo by Underwood & Underwood, New York

RUSSIAN CAVALRY SCOUTS

SHOWING THE NATURE OF MUCH OF THE COUNTRY ON WHICH THERE HAS BEEN SEVERE FIGHTING. MANY OF THESE GREAT DOGS ARE USED BY THE SCOUTS

Photo by International News Service

RUSSIAN METHOD OF USING LOG FORTIFICATIONS

DURING THE WINTER CAMPAIGN IN GALICIA THE RUSSIANS FOUND THE GROUND FROZEN SO HARD IT WAS IMPRACTICAL TO DIG TRENCHES, SO TREES WERE FELLED BY THE THOUSANDS AND USED TO MAKE LOG PROTECTIONS SIMILAR TO THE ONE SHOWN IN THE PICTURE. IN THIS TEMPORARY FORT A RUSSIAN OFFICER IS STATIONED WITH A LOOKOUT APPARATUS

Photo by International News Service

RUSSIANS IN THE TRENCHES IN POLAND

THOUSANDS UPON THOUSANDS OF TREES HAVE BEEN FELLED ALONG THE RUSSIAN FRONTS FOR THE BUILDING OF DEFENSIVE WORKS AS ON MOST OF THE TERRITORY ON WHICH THE CZAR'S TROOPS HAVE FOUGHT THERE IS MUCH FORESTED LAND

"As a general proposition in shell fire I am not of the opinion that any of it is very destructive without resistance. Even the heavy calibres bursting in mud or soft ground do an astonishingly small amount of damage, while in the air their destructiveness is due mostly to the sheaf of shrapnel or the flying fragments, the energy of which is rapidly lost and, while perhaps annoying to men, cannot be construed, I believe, to have a very vital effect on standing timber. The shells of the heavier calibres, from the 15 centimetre field howitzers up, do, of course, more damage in timber, but even this is trifling in general, the reason for this being that it is difficult to get observation that will give the range of troops in woods,and hence dropping shells is largely a waste of ammunition. There are of course a few places where fire has been concentrated where the forests have been utterly destroyed, but these patches are nothing but clearings of a few square kilometers and cannot be considered as having any bearing on the entire situation. There is one such spot on the Bzura front, unnecessary to locate more specifically, where the Germans in their February attacks are said to have concentrated over a short front 600 guns. This patch of timber has been reduced to kindling wood but it is almost a unique exception.

"The woods in Poland have given the very best possible cover, in my opinion, for the operations of artillery. I have, myself, been in a number of 15 centimetre howitzer batteries beautifully masked in timber. These are invariably using indirect fire with panorama sights

Photo by International News Service

RUSSIAN TROOPS IN THE CARPATHIAN MOUNTAINS

HERE COUNTRY SIMILAR TO THAT FOUND IN GALICIA AIDED THE TROOPS IN DEFENSIVE OPERATIONS AND TRENCHES MILES IN LENGTH WERE DUG IN THE FORESTS. IT WAS DIFFICULT FOR ARTILLERY TO OPERATE IN THE FORESTS AND INFANTRY OPERATIONS WERE THEREFORE ALL THE MORE EFFECTIVE

turned to an aiming point in rear or flank with point of observation miles away, with telephone connections to check the effect of fire. It is possible that much of the forest may have been felled for works but I have personally seen no evidence of it.

"The most intense forest fighting has probably been in the vicinity of Suwalki on the East Prussian front where the tide of war has carried both armies back and forth for many months. I have not been on that front and so can express no opinion of the fighting there. The Russians followed them in at the point of the bayonet and for nine days the battle raged in this belt. I think there is nothing since our battle of the Wilderness to compare to it."

Mr. Washburn's description of this battle, which also appears in his book, "Field Notes From the Russian Front" is thrilling in the extreme and graphically tells of the kind of fighting which occurs in heavily wooded country. He says:

"The Russian soldier is to me the most philosophical individual in the

Photo by International News Service

GERMANS GETTING TIMBER FOR TRENCHES

IN POLAND THE GERMANS FREELY UTILIZED THE TIMBER FROM THE HEAVY FORESTS TO BUILD AND PROTECT THEIR TRENCHES AND THOUSANDS OF TREES WERE USED FOR THIS PURPOSE

The worst place where I have seen the evidence of forest fighting was in the patch of woods lying between Konstienze, near the Vistula, and Radom. All of this is blocked under the head of the Battle Around Ivangrod. This was the Austro-German advance on Warsaw and Ivangrod. The enemy never got beyond the Vistula. One of our Caucasian Corps crossed the river, took the Austrians in the flank and drove the whole enemy forces back into this patch of wood which is perhaps 10 kilometers wide and 30 kilometers long and composed of really dense timber, fir and spruce, I should say.

world. I have seen him in the hospitals with arms and legs gone, head smashed in, ghastly wounds of all sorts, and if he has the strength to speak at all, he whispers 'Nichivo,' the equivalent of which in English is 'What difference does it make, anyway?' After a glimpse of the men and the munitions that permeate the life behind the army, one is not surprised at the feats that these same men, backed by their organization and transport, are performing every day on the actual field of battle. While it is true that many of the recent actions have been rearguard affairs, where it has been perfectly

Photo by International News Service

TIMBER USED FOR TRENCHES

A FOREST ALONG THE LINE OF THE GERMAN ADVANCE THROUGH POLAND SHOWING THE HEAVY GROWTH AND HOW THE SOLDIERS TAKE ADVANTAGE OF THE SHELTER OF THE FOREST TO ENTRENCH THEMSELVES. SUCH TRENCHES EXTEND FOR MILES

TYPICAL BATTLE GROUND IN GALICIA

COUNTRY LIKE THIS PROTECTED BY WIRE ENTANGLEMENTS MADE THE ADVANCE OF ONE SIDE OR THE OTHER SLOW AND DIFFICULT AND THOUSANDS OF RUSSIANS, GERMANS AND AUSTRIANS HAVE MET DEATH IN SANGUINARY BATTLES IN THE HEAVY WOODS

obvious that the enemy was making a stand only long enough to permit him to get out his impedimenta at his leisure, it is equally true that there have been other actions where he had not the slightest idea in the world of leaving unless he was forced.

"The best illustration of this is the battle which seems to be known in a vague way as the battle of Ivangrod. I have asked many people in the last few days what they knew of this action. All seemed to be aware in a general way that it was an important Russian victory. Some said it was a German-Austrian rearguard action; but few seemed to know any of the details of the contest which, in any other war that this world has ever seen, would have filled books with its details of fierce hand-to-hand fighting. As far as I know there is nothing in the history of war, with the possible exception of the American battle of the Wilderness, that can touch this event I speak of; and the Virginia campaign, as regards losses, duration, and men engaged, was a mere skirmish compared with this. Yet here a few weeks afterwards, beyond the mere fact of it having taken place and having been won by the Russians, practically nothing is known about it.

"I shall not attempt to describe the military or strategic aspects of this desperate spot, because if one begins on historical relation of battles in this war there is absolutely no ending. I shall, however, sketch just a little of it, to indicate the nature of the work that the Russian soldiers did here. For in no battle of the whole war, on any front, has the fibre, determination and courage of troops been put more severely to the test than in this one. The German programme, as has been pointed out, contemplated taking both Warsaw and Ivangrod and the holding for the winter of the line formed by the Vistula between the two. The Russians took the offensive from Ivangrod, crossed the river and, after hideous fighting

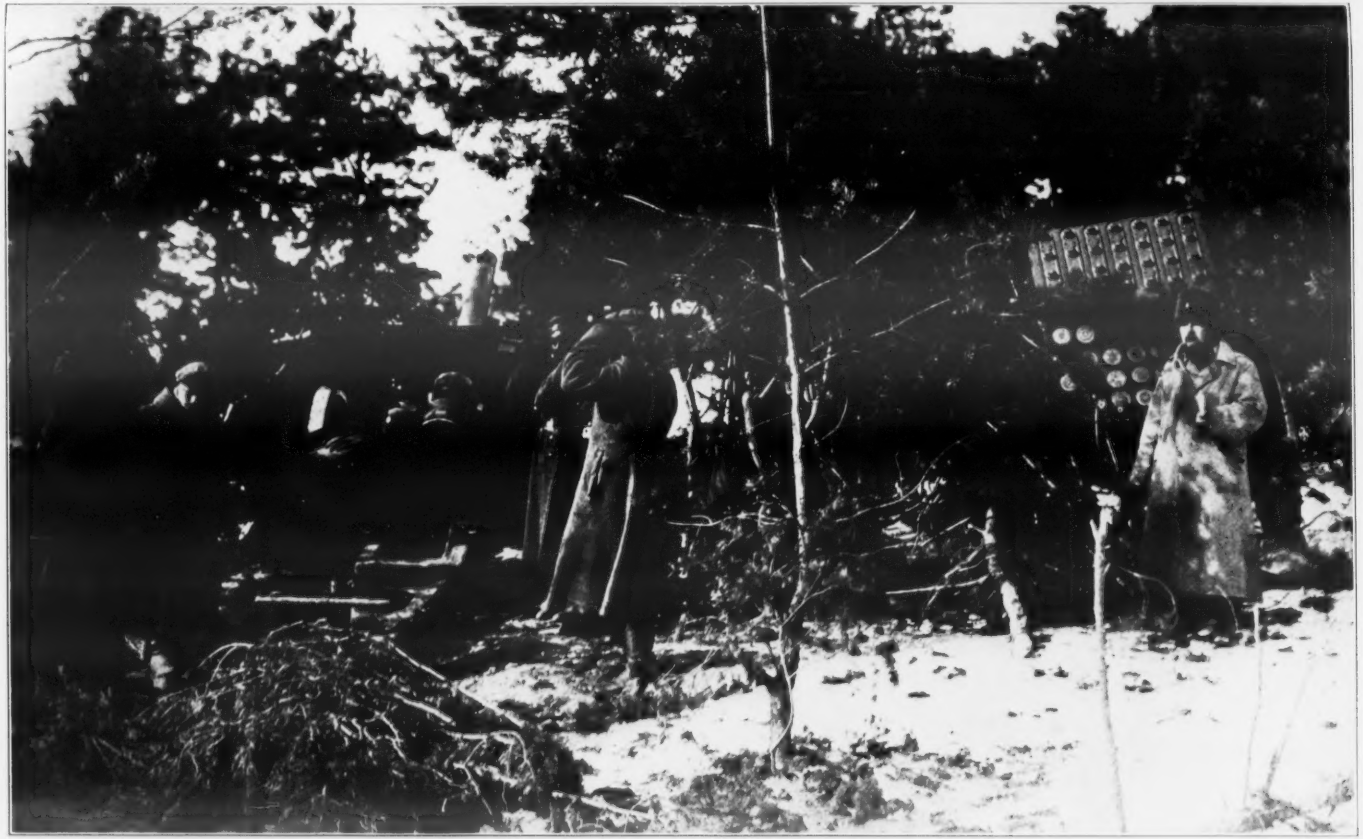


Photo by International News Service

A Russian Heavy Battery in a Forest Near Warsaw

HERE THE HEAVY GROWTH OF TREES FURNISHED AN EFFECTIVE SCREEN FOR THE BIG GUNS FOR SOME HOURS. FINALLY AUSTRO-GERMAN AIRMEN LOCATED THE RUSSIAN GUNS AND THE AUSTRO-GERMAN BOMBARDMENT OF THE WOODS, DURING WHICH NUMEROUS TREES WERE DESTROYED OR DAMAGED, FOLLOWED

Photo by International News Service

RUSSIAN OUTPOST IN GALICIA

TREES ARE CUT DOWN AND POSTS MADE FROM THEM FOR THE PURPOSE OF ERECTING THE WIRE ENTANGLEMENTS WITH WHICH ALL THE CONTENDING ARMIES PROTECT THEMSELVES AGAINST INFANTRY ATTACKS

fairly drove Austrians and Germans from positions of great strength around the quaint little Polish town of Kozienice. From this place, for perhaps 10 miles west, and I know not how far north and south, there is a belt of forest of fir and spruce. I say forest, but perhaps jungle is a better term for it, for it is so dense with trees and underbrush that one can hardly see 50 feet away. Near Kozienice the Russian infantry, attacking in flank and front, fairly wrested the enemy's position and drove him back into this jungle. The front was itself bristling with guns, and I counted in about a mile position, forty-two guns. The taking of this line was in itself a test of the mettle of the Russian peasant soldier.

"But this was only the beginning. Once in the wood, the Russian artillery was limited in its effect upon the enemy; and in any event, the few roads through the forest and the absence of open places made its use almost impossible The enemy retired a little way into this wilderness and fortified. The Russians simply sent their troops in after them. The fight was now over a front of perhaps 20 kilometers. There was no strategy.

"It was all very simple. In this belt were Germans and Austrians. They were to be driven out, if it took a month. The carnage began.

"Day after day the Russians poured troops in on their side of the wood. These entered, were seen for a few minutes, then disappeared in the labyrinth of trees and were lost. Companies, regiments, battalions, and even brigades were absolutely cut off from each other. None knew what was going on anywhere but a few feet in front. All knew that the only thing required of them was to keep advancing. This they did,

Photo by International News Service

AUSTRIANS IN AN ENTRENCHED POSITION

OWING TO THE HEAVILY WOODED CHARACTER OF THE COUNTRY IT IS DIFFICULT TO DETECT THESE DEFENSES AT A DISTANCE. THEY SHIELD THE DEFENDERS FROM INFANTRY AND ARTILLERY FIRE. HEAVY LOGS COVERED WITH EARTH ARE USED FOR THE ROOFING AND THIS IS SO SOLID AND WELL CONSTRUCTED THAT IT WILL RESIST SHRAPNEL FIRE

foot by foot and day after day; fighting each other hand to hand; taking, losing and retaking position after position. In all of this 10 kilometers of forest I dare venture to say there is hardly an acre without its trenches, rifle pits and graves.

"Here one sees where a dozen men had a little fort of their own and fought furiously with the enemy a few feet away in a similar position. Day after day it went on, and day after day troops were poured into the Russian side of the wood; and day and night the continuous crack of rifle fire and the roar of artillery hurling shells into the wood, could be heard for miles. But the artillery played a lesser role, for the denseness of the forest made it impossible to get an effective range. Yet they kept at it, and the forest for miles looks as though a hurricane had swept through. Trees staggering from their shattered trunks, and limbs hanging everywhere, show where the shrapnel shells have been bursting. Yard by yard the ranks and lines of the enemy were driven back, but the nearer their retreat brought them to the open country west of the wood, the hotter the contest became; for each man in his own mind must have known how they would fare when, once driven from the protecting forest, they attempted to retreat through the open country without shelter.

"The state of the last two kilometers of the woody belt is hard to describe. There seems scarcely an acre that is not sown like the scene of a paper-chase, only the trail here is bloody bandages and bits of uniform. Here also there was small use for the artillery, and the rifle and the bayonet played the leading role. Men, fighting hand to hand with clubbed muskets and

Photo by International News Service

A Trench in a Galician Forest

MUCH OF THE GROUND OVER WHICH THE CONTENDING FORCES IN THE EAST HAVE FOUGHT IS SIMILAR TO THIS SHOWN IN THE PICTURE. HERE THE TRENCH AND THE FOREST COMBINE TO PROTECT THE DEFENDERS AND MAKE THE ATTACK DIFFICULT

bayonets, fought from tree to tree and ditch to ditch. Systematically, patiently, stoically, the Russians sent in fresh troops at their side of the wood.

"The end was of course inevitable. The troops of the Dual Alliance could not, I suppose, fill their losses, and the Russians could. Their army was under way, and they would have taken that belt of wood if the entire peasant population of Russia had been necessary to feed the maw of that ghastly monster of carnage in the forest. But at last the day came when the dirty, grimy, bloody soldiers of the Czar pushed their antagonists out of the far side of the belt of woodland. What a scene there must have been in this lovely bit of open country, with the quaint little village of Augustow at the cross-roads.

"Once out in the open, the hungry guns of the Russians, that had for so long yapped ineffectively and sightlessly into blind forest, got their chance. Down every road through the wood, came the six-horse teams with the guns jumping and jingling behind, with their accompanying caissons heavy with shrapnel. The moment the enemy were in the clear, these batteries, eight guns to a unit, were unlimbered on the fringe of the wood and were pouring out their death and destruction on the wretched enemy now retreating hastily across the open.

"The place where the Russians first turned loose on the retreat is a place to remember—or to forget, if one can. Dead horses, bits of men, blue uniforms, shattered transport, overturned gun carriages, bones, broken skulls, and grisly bits of humanity strew every acre of the ground. A Russian officer, who seemed to be in authority on this gruesome spot, volunteered the information that already they had buried at Kozienice in the wood and in the open 16,000 dead; and as far as I could make out the job was still a long way from being completed. Those who had fallen in the open, and along the road, had been decently interred, as the forests of crosses for 10 miles along that bloody way clearly indicated; but back in the woods themselves, there were hundreds and hundreds of bodies lying as they had fallen. Sixteen thousand dead means at least 70,000 casualties all told, or 35,000 on a side if losses were equally distributed. This is figured on the basis of the 16,000 dead which were already buried, without allowing for the numbers of the fallen that still lie about in the woods. And yet this is a battle the name of which is, I dare venture to say, hardly more than known either in England or the United States, and in which the losses on both sides probably amount to more than the entire army that Meade commanded at the battle of Gettysburg." If one wants to get an idea of what war is under these conditions, it is only necessary to stroll back among the trees and wander about among the maze of rifle pits and trenches thrown up by the desperate soldiers as they fought their way forward or defended their retreat."

AN EXPLANATION

A POEM "A Tale of the Trail" appearing in AMERICAN FORESTRY for April was by error credited to Matt Daly a preacher-poet who is working among the lumberjacks of the north. It was written by Mr. James W. Foley of Oakland, Cal., and was published in a volume of his writings. Mr. Daly saw the poem reproduced in a Minnesota paper, typed it and sent it to a friend who, thinking it was Mr. Daly's own, sent it to AMERICAN FORESTRY for publication. This explanation is made in justice to Mr. Foley and in response to a letter from him.

CALIFORNIA TREE NOVELTIES

PART I

By E. A. STERLING

[The information contained in this article, and in the one to follow in August, will be most desirable to the visitor, who, going to California this summer or fall, will take time to see some of the natural wonders of the State, among which are the magnificent trees and forests. Mr. Sterling tells what trees may be seen along the regular tourist routes, and he knows, as he has ridden over a considerable portion of the State's forested area.—EDITOR.]

CALIFORNIA announces its faith in itself and in the nation, by the simultaneous presentation of two great expositions at a time when the world is staging the most tremendous events in history. Such confidence deserves well of the visitors who seek her hospitality. Yet only a small part of what the Pacific coast has to offer is found among the artistic and commercial features so wonderfully assembled at the Panama-California and Panama-Pacific Expositions.

California can offer unparalleled natural attractions which are her very own, and every one interested in the unique and beautiful in the way of mountains and forests, will find much that is fascinating and inspiring on or near the established tourist routes in this great out door playground of the West. From the low wooded mountains in sight of the grounds of the Panama-California Exposition at San Diego, northward along the Sierra Madre, Sierra Nevada and coast ranges, past the ocean slopes which look down on the golden city by the western gate to Mount Shasta and the Siskiyou Mountains on the northern boundary is an enormous forest region more diversified in character and with more wonderful trees than are found in any other spot or region on earth. In kind, in size, in beauty, and in abundance, California forests are absolutely unexcelled.

John Muir, who knew California mountains and forests as no other man knew them says in his book "The Mountains of California:" "The distribution of the general forest in belts is readily perceived. These extend in regular order from one extremity of the range to the other; and, however dense and somber they may appear in general views, neither on the rocky heights nor down in the leafiest hollows will you find anything to remind you of the dank, malarial selvas of the Amazon and Orinoco, with their 'boundless contiguity of shade,' the monotonous uniformity of the Deodar Forests of the Himalaya, the Black Forest of Europe, or the dense dark woods of Douglas Spruce where rolls the Oregon. The giant pines, and firs, and Sequoias hold their arms open to the sunlight, rising above one another on the mountain benches, marshaled in glorious array, giving forth the utmost expression of grand beauty with inexhaustible variety and harmony.

"The inviting openness of the Sierra woods is one of their most distinguishing characteristics. The trees of all the species stand more or less apart in groves, or in small, irregular groups, enabling one to find a way nearly everywhere, along sunny colonnades and through openings that have a smooth, parklike surface, strewn with brown needles and burs. Now you cross a wild garden, now a meadow, now a ferny, willowy stream; and ever and anon you emerge from all the groves and flowers upon some granite pavement or high, bare ridge commanding superb views above the waving sea of evergreens far and near. * * *

* * * "Crossing the treeless plains of the Sacramento and San Joaquin from the west and reaching the Sierra foot-hills, you enter the lower fringe of the forest, composed of small oaks and pines, growing so far apart that not one-twentieth of the surface of the

AT BEAUTIFUL LAKE TAHOE

A TYPICAL ROAD, LAKE AND MOUNTAIN SCENE IN THE LAKE TAHOE COUNTRY. INCENSE CEDAR ON LEFT FOREGROUND, FIR ON RIGHT, WITH YOUNG FIR AND YELLOW PINE ON THE EDGE OF THE LAKE

DEEP SNOW COVERS MUCH OF THESE TREES

GENERAL VIEW SHOWING SCANTY FOREST COVER AT HIGH ELEVATION IN VICINITY OF GLEN ALPINE, SILVER PINE, LODGEPOLE PINE, BLACK HEMLOCK IN FOREGROUND, EL DORADO NATIONAL FOREST, CALIFORNIA. THE SNOW IS BETWEEN 20 AND 30 FEET DEEP IN PLACES ALONG HERE

ground is in shade at clear noonday. After advancing 15 or 20 miles, and making an ascent of from 2,000 to 3,000 feet, you reach the lower margin of the main pine belt, composed of the gigantic Sugar Pine, Yellow Pine, Incense Cedar and Sequoia. Next you come to the magnificent Silver Fir belt, and lastly to the upper pine belt, which sweeps up the rocky acclivities of the summit peaks in a dwarfed, wavering fringe to a height of from 10,000 to 12,000 feet."

Under a wide diversity of altitude, climate and soil, the greatest possible extremes in tree growth are produced To see and appreciate to the full what the Pacific coast has to offer in the way of trees would take years. Even the casual visitor, however, will have ample opportunity to see examples of the extreme conditions and of the best which lies in between. One cannot reach San Diego without seeing from the car windows, the stunted pinõn pines and diminutive oaks of the foot hills, with a touch of desert flora thrown in. A little more effort will be required to see the optimum of tree growth in the giant Sequoias of the Sierras, or the magnificent redwoods of the northern coast country. Under the influence of heavy rains and the dense fogs which roll in from the Pacific, there has been produced a redwood forest so dense and so dark and composed of such large individual trees, that they seem more like vegetation of long past geological ages. Even larger trees, but

in less dense forests, are found on the west slopes of the Sierras, where the Sequoias have been left grouped on restricted areas, which were untouched by the flood of glacial ice, which in ages past broke through to the coastal plains.

Of these redwoods, John Muir well says: "The redwood is the glory of the Coast Range. It extends along the western slope, in a nearly continuous belt about 10 miles wide, from beyond the Oregon boundary to the south of Santa Cruz, a distance of nearly 400 miles, and in massive, sustained grandeur and closeness of growth surpasses all the other timber woods of the world. Trees from 10 to 15 feet in diameter and 300 feet high are not uncommon, and a few attain a height of 350 feet or even 400, with a diameter at the base of 15 to 20 feet or more, while the ground beneath them is a garden of fresh, exuberant ferns, lilies, gaultheria, and rhododendron. This grand tree, Sequoia sempervirens, is surpassed in size only by its near relative, Sequoia gigantea, or Big Tree, of the Sierra Nevada, if, indeed, it is surpassed. The sempervirens is certainly the taller of the two. The gigantea attains a greater girth, and is heavier, more noble in part, and more sublimely beautiful. These two Sequoias are all that are known to exist in the world, though in former geological times the genus was common and had many species. The redwood is restricted to the Coast Range, and the Big Tree to the Sierra. As timber the redwood is too good to live. The largest sawmills ever built are busy along its seaward border, 'with all the modern improvements,' but so immense is the yield per acre it will be long ere the supply is exhausted. The Big Tree is also, to some extent, being made into lumber. It is far less abundant than the redwood, and is, fortunately, less accessible, extending along the western flank of the Sierra in a partially interrupted belt, about 250 miles long, at a height of from 4 to 8,000 feet above the sea. The enormous logs, too heavy to handle, are blasted into manageable dimensions with gunpowder. A large portion of the best timber is thus shattered and destroyed, and, with the

COULTER PINE, SAN GABRIEL MOUNTAINS, CAL.

SCATTERED COULTER PINE GROWING IN THE SPARSE CHAPARRAL ON THE LOWER SLOPES AND ALONG THE DRY STREAM BEDS IN THE SAN GABRIEL MOUNTAINS, SOUTHERN CALIFORNIA. BOTH FIRE AND ARIDITY ARE RESPONSIBLE FOR THE SCANTY VEGETABLE GROWTH, AND THE REFORESTATION OF SUCH SITES IS VERY DIFFICULT. THE WHITE STALKS SEEN SCATTERED THROUGHOUT THE PICTURE ARE THE FLOWER STEMS OF THE LOW GROWING YUCCA KNOWN AS SPANISH BAYONET, WHICH ARE VERY BEAUTIFUL WHEN IN BLOSSOM

SOME WASHINGTON PALMS

A GROUP OF WASHINGTON PALMS IN PALM CANYON ON THE ANGELES NATIONAL FOREST. THE ABSENCE OF OTHER TREE GROWTH AND THE SCANTY CHARACTER OF THE CHAPARRAL INDICATES THE EXTREME HARDINESS OF THESE TREES, AND THEIR ABILITY TO SURVIVE UNDER EXTREME CONDITIONS OF DROUGHT, FROM WHICH THEY ALSO DERIVE THE NAME OF DESERT PALM. EVEN UNDER THESE UNFAVORABLE CONDITIONS THEY ARE THE LARGEST NATIVE PALMS GROWING WITHIN THE BORDERS OF THE UNITED STATES

huge, knotty tops, is left in ruins for tremendous fires that kill every tree within their range, great and small. Still, the species is not in danger of extinction. It has been planted and is flourishing over a great part of Europe, and magnificent sections of the aboriginal forests have been reserved as National and State Parks—the Mariposa Sequoia Grove, near Yosemite, managed by the State of California, and the General Grant and Sequoia National Parks on the Kings, Kaweah, and Tule Rivers, efficiently guarded by a small troop of United States Cavalry under the direction of the Secretary of the Interior. But there is not a single specimen of the redwood in any National Park. Only by gift or purchase, so far as I know, can the Government get back into its possession a single acre of this wonderful forest."

These historic and notable trees have been described and pictured until familiar to everyone. Within a few hours horseback ride of some of the Sequoias, is found another extreme in the timber-line trees at the higher altitudes in the Sierras. Several species which attain commercial size on the intermediate and lower slopes, become small and stunted as the higher altitudes are reached. Others, notably the white bark pine, have their natural habitat on the upper slopes at altitudes of 6,000 to 8,000 feet; while still higher up towards the zone of perpetual snow or barren rock are other trees which exist only in the harsh environment to which the endless struggle for existence has

KNOBCONE PINE AND COULTER PINE IN CHAPARRAL, SAN BERNARDINO MOUNTAINS, ANGELES NATIONAL FOREST, CALIFORNIA

THE NON-COMMERCIAL TREE GROWTH OF THE FOOTHILLS AND INTERMEDIATE SLOPES ON THE SAN BERNARDINO MOUNTAINS. CHAPARRAL COVERS THE GROUND BETWEEN THE TREES, AND WHILE A DENSE FOREST ON THE DRY SLOPES CAN NEVER BE EXPECTED, THE TREES WOULD RECLAIM MUCH OF THE AREA NOT CHECKED BY FIRES. THE DEAD TRUNKS ON THE RIGHT OF THE PICTURE ARE PROBABBLY FIRE KILLED. AT THE TOP OF THE DEAD TREE WHICH IS OUTLINED AGAINST THE SKY ON THE LEFT OF THE PICTURE, CAN BE SEEN THE PERSISTENT CONES OF THE KNOBCONE PINE, WHILE THE TREE OCCUPYING THE SAME RELATIVE POSITION ON THE RIGHT SIDE IS A COULTER PINE, ONE OF THE LARGE CONES BEING PLAINLY VISIBLE IN THE TOP

CHAPARRAL, SPRUCE, BULL PINE AND SUGAR PINE

FOREST DISTRIBUTION AS INFLUENCED BY SLOPE AND EXPOSURE IN THE SIERRA MADRE RANGE IN SOUTHERN CALIFORNIA. CHAPARRAL ON THE DRY SOUTH SLOPES, BULL PINE, SUGAR PINE AND SPRUCE ON THE WEST SLOPES, RIDGES AND COOL RAVINES. THE ABRUPT TRANSITION FROM FOREST TO CHAPARRAL ON THE RIDGE SUMMITS IS SEEN FROM MANY ROADS AND TRAILS RUNNING UP INTO THE MOUNTAINS FROM SAN BERNARDINO AND PASADENA

driven them and made them fitted. On some of the flattened Sierra ridge summits or rocky slopes scanty tree growth is maintained on almost bare rock, the disintegrated granite or rock crevices giving support to foxtail, lodgepole and even yellow pine. Only trees of great hardiness can withstand these conditions of extreme temperatures, drought and lack of soil. From the stage road along the Merced in the lower end of Yosemite Valley look for the large tree on a narrow ledge high up on the rocky face of El Capitan. Also see the smaller trees growing out of apparently solid rock on the granite knobs near Prospect Point and Mirror Lake. The limber pine is the high Alpine climber, its high inaccessible range being from 8,000 to 12,000 feet on the higher slopes and lower peaks of the Sierras, where it exists as the advance guard at the upper timber line. The growth is very slow, the limbs are often larger than the trunk which remains stunted, and trees only a few feet high may be over 200 years old. It is a distorted, dwarfed and pathetic specimen, often hardly shoulder high, and found clinging in situations where vegetable life of any kind seems impossible.

The desert regions produce other forms of tree growth which are unique and unusual because of the long struggle which has adapted them to existence with a minimum of moisture. There are regions in California where the annual rainfall is less than 10 inches, which by comparison with other portions of the State which have a precipitation of 6 or 8 feet, produce a striking parallel. There is a natural relation between rainfall and temperature with the consequent extremes between heat and cold, which also have their effect upon tree growth. Then in between lie all the gradations and overlapping conditions which produce the

THE AUTHOR AND A SEQUOIA

BASE OF SEQUOIA TOP LEFT BY LUMBERMEN. FIVE 16-FOOT LOGS WERE TAKEN OUT. THE HOLE WAS BURNED BY FIRE WHICH RAN THROUGH SLASH SEVEN YEARS AGO. TULARE COUNTY, SEQUOIA NATIONAL FOREST, CAL.

wealth and variety of forests for which California is famous.

The large, inspiring and beautiful in the way of tree growth is confined to the regions of moderate or heavy precipitation. Under desert conditions, the flora is stunted, scanty and weird. The tree yuccas contribute strikingly to the desert flora. Seen from the Santa Fe trains on the Mohave desert these are easily the "most wild-looking denizens of desert hills and plains," but to ride and live among them completes the sense of weirdness which they produce. To see the Joshua tree or Mohave yucca by moonlight, or as sometimes happens, under a fall of snow, leads one to question his sanity, or his existence on a well ordered conventional earth. The most beautiful member of the desert flora is the Washington palm, or "desert palm," of which the only species found in the United States inhabits the Colorado desert and arid canyons of Southern California. It is the largest of our native palms, growing to an extreme height of 60 to 70 feet with great leaves 4 feet wide and stems 5 to 6 feet long. The best known grove is in Palm Canyon in the San Jacinto Mountains, near Agua Caliente, 10 miles south of the Southern Pacific Railroad at Seven Palms.

Many visitors to the Panama Expositions will make the side trip to

YELLOW PINE AND FIR REPRODUCTION

THE STRUGGLE BETWEEN THE FOREST AND THE CHAPARRAL AT THE FOOT OF MOUNT SHASTA. FIRE IS THE ALLY OF THE CHAPARRAL. WITHOUT IT THE PINES, FIR AND CEDAR WOULD WIN BACK THE LOST GROUND. THIS VIEW AND MANY LIKE IT CAN BE SEEN FROM THE TRAIN JUST NORTH OF SISSON ON THE SHASTA ROUTE OF THE SOUTHERN PACIFIC

Yosemite. By either route the transition from the chaparral and foot hills to the Sierra Forests of Douglas fir, cedar and pine will be seen. In the foot hills the live oaks and digger pine will be the prominent features of the landscape and an open non-commercial forest carpeted with low growing chaparral species will be traversed. The digger pine is the most ghostly of all pines, its grayish green and scanty foliage bringing into prominent relief the trunk and limbs of skeleton shape and aspect, with the peculiar U-shaped forks. Studded among the oaks of the foot hills, with the chaparral as a back ground, is the red barked manzanite lending a touch of color, by which a forest condition of unusual artistic charm is created. As the higher slopes are reached, but where the arid conditions of the valley are still felt, yellow pine and fir will begin to appear in the sheltered moist ravines and on north slopes. Finally the true forests of the intermediate slopes of the Sierras will be found under a variety of groupings and mixtures dependent on local conditions of soil, moisture and exposure.

The Sierra commercial forests are not seen at their best on any of the usual scenic routes. The sugar and yellow pines, fir, cedar and spruce, which contribute to the importance of California as a lumber producing State, have been largely cut out near the railroads and are not up to standard where the travel booklets tell one to go. To see these forests one must go into the lumber camps off the established routes of travel, although glimpses may be had from the highways and byways over which the hurried visitor travels. The Lake Tahoe country, for example, gives some idea of what these forests were before fire and commercial necessity took their toll. On the slope

WHERE THERE IS A HARD STRUGGLE FOR EXISTENCE
WHITEBARK PINE AT UPPER LIMIT OF TREE GROWTH ON PYRAMID PEAK, EL DORADO NATIONAL FOREST, CAL.

above the lake the struggle between chaparral and the forests is keenly waged with the forest winning back its ground where fire is absent for a few years. Mark Twain in "Roughing It" describes the Tahoe Forests of fifty years ago and gives a wonderful description of a forest fire. South of Lake Tahoe is a wonderful sub-Alpine Lake country, where one may fish through the ice in May and near timberline see mountain hemlock 30 to 50 feet high buried almost to their tips in snow. Comparatively short trips from Weed, Sisson or McCloud in the Mount Shasta region. take one into the forests of sugar and yellow pine; while from various points such as Chico and Madera in the Sacramento and San Joaquin Valleys the lumber camps can be reached by stage or logging railroad. The sugar pine is perhaps at its best on the American River east of Sacramento; while the railroad trip to Angels Camp, in Calaveras County, made famous by Bret Harte and Mark Twain, is a revelation of forest scenes.

The species comprising the typical Sierra Forest do not possess unique or surprising features. It is simply the wonderful abundance and the high quality of the timber which creates the effect that mature forests always do, of impressiveness and a desire to abandon care and pitch a tent where the best trees are The individual trees, under normal conditions are tall, with clear and straight trunks, many being 6 to 8 feet in diameter, although the average is less; but the eastern visitor loses the sense of size because of the absence of comparative standards. The eastern forests of 5 to 10,000 feet per acre with individual trees running up to 2 or 3 feet, are dwarfed by these western forests, where the stand may run 30, 50 or even a 100,000 feet per acre. There is too, in some regions, an

A BROKEN CONIFEROUS FOREST

THIS IS IN THE VICINITY OF MOUNT SHASTA IN THE SHASTA NATIONAL FOREST, SISKIYOU COUNTY, CALIFORNIA, AND THIS TYPE OF FOREST MAY BE SEEN FROM THE SOUTHERN PACIFIC RAILROAD LINE WHICH PASSES MOUNT SHASTA

apparent scantiness to the forest, yellow pine, for example, often growing in open parklike stands which permit grass or chaparral to grow densely underneath.

(To be continued in August.)

AMERICAN WILLOW INDUSTRY

BECAUSE the European supply of willow rods has been largely cut off several American manufacturers of willow furniture and baskets have asked the Department of Agriculture for the addresses of persons in this country who have taken up willow growing. For some years the Department has distributed willow cuttings of imported varieties with a view to developing the production of high-grade willow rods in the United States. The usual imports of willows come chiefly from England Belgium, Holland, France and Germany, but these sources have been practically closed for several months.

One manufacturer reports that Japanese osiers are taking the market formerly supplied by Germany, at a slightly higher price. Finished willow baskets from Japan have come in where split bamboo was the only Japanese basketware on sale before the war. As a consequence of the shortage of imported osiers, it is said, the price of American willows has increased and growers here are meeting with a heavy demand for their product.

THE IMPROVED

American Forestry Magazine

Tree identification and tree knowledge articles will be a feature each month of the enlarged and greatly improved issues of American Forestry Magazine starting with the August issue.

THE TULIP OR YELLOW POPLAR TREE will be the first one featured. The cover of the magazine will be a strikingly attractive picture in four colors of a typical Tulip or Yellow Poplar tree, its bark, its leaves and its buds and these will be of the greatest value in identifying the tree readily.

In addition there will be an illustrated article upon the characteristics and the history of the tree by a recognized expert, an article which will instruct our readers so that they may have comprehensive information about it.

COMMERCIAL USES OF TULIP OR YELLOW POPLAR will be another profusely illustrated article, telling in detail for which articles of commerce it is most used and most serviceable. This will be of unusual value.

ORNAMENTAL AND SHADE TREES will be given a special department. This, conducted by Mr. J. J. Levison, will be a monthly feature which will give much needed information to our members having ornamental and shade trees and desiring to know how to take care of them.

CHILDREN'S KNOWLEDGE OF FORESTRY will be another department which will be devoted to educating children in tree knowledge and forestry, giving them such information that they will grow to love and to know trees and their value. This will be conducted by Mr. Bristow Adams of Cornell University.

WOOD PRESERVATION which has a decided practical value in forest conservation will be a monthly department conducted by Mr. E. A. Sterling, former president of the American Wood Preservers Association. As treated woods are now in use by farmers and housebuilders, the need of a department giving the best advice about the subject is evident.

BIRDS AND THE NEED OF THEM will be another subject given a special department. The conservation of birds is vitally necessary to the preservation of human life. So few people realize this that American Forestry will make a special effort to promote proper protection and care of birds.

PRIVATE FORESTRY AND WOODLOT FORESTRY, both important, will be written about by experts whose advice will be found of great assistance.

NATIONAL, STATE AND MUNICIPAL FORESTRY will receive attention in a number of articles by able writers, as will the great variety of subjects pertaining to the forests not only in this country but abroad.

A WORD TO MEMBERS

If you are pleased with your magazine will you not ask your friends to become members. We need more. One new member secured by each present member would DOUBLE the association's educational value.

SPRAYS OF THE TULIP TREE

HARDWOODS ON THE COUNTRY ESTATE

By WARREN H. MILLER, M. F.

IT IS with much pleasurable anticipation that I start in upon this introduction to my favorites among what may be called the isolated tree species among the broad leaves. For many of these do not occur in large families as do the oaks and maples and hickories, but rather a single representative, or two at most, is accorded us here in America, large as the family may be elsewhere on the globe. Yet these trees represent some of the most beautiful and the most stately of all our forest denizens, and without them we would feel that many beloved old favorites would be wanting. I refer to the tulip tree, the linden, the sweet and sour gums, the two dogwoods, the two willows, the wild cherries, the two walnuts, the chestnuts, and that noble gray gaint, the beech. Can you conceive of a forest without these trees? And could you forgive the lack of variety that would ensue from their total omission? Commercially, for the sake of selling large blocks of lumber all of a grade and kind, we might tolerate the European system of pure forests, all oaks, or all hornbeam, or all beech; but to the country estate owner, while he may have his stands of pure oak and his sugar bush, his forest as a whole will not satisfy unless it presents a landscape bordered at least with a fair representation of the amazing diversity of our native tree species.

The liriodendron or tulip tree is one of these satisfactory old favorites, growing rapidly to a huge column of tree, a veritable factory chimney in bark, rising sheer without a limb to a fork 50 feet from the ground. And then its noble head, solid and mighty, bedecked with gay tulip flowers in June, a grand shaft of orange yellow leaves in October, and all through the

winter lifting its pointed seed shafts into the blue heavens for all the birds in the world to feed upon (and it's seldom that there aren't a few of them twittering about up there during the winter, too). No need to plant in fresh liriodendrons, —if there is a big one about he will people the earth with tulip trees, seeding mostly a few hundreds of yards to the northeast of himself due to the prevailing southwest winds of autumn. Young forest-grown ones are hard to transplant, so that if you need one to decorate some conspicuous vantage point where there is little likelihood of a seed being blown, either seed it yourself or get a young nursery specimen, a 12-foot tree costing you $1.50. Identification of this tree is easy even when young. Look for a large blunt-ended leaf something like a maple leaf with the point cut off. In young trees these leaves are huge, reaching 14 inches in length, and they are often of irregular shape so that they are apt to be taken for a sassafras except that the aromatic sassafras odor is lacking. The flower is a large, yellow and orange tulip, and fruit a long green cone which turns brown during the fall and is composed of a sheaf of winged orange seeds, blown far and wide during the winter. You will find that nature has been kind in the matter of tulip trees for they grow on any base soil not too dry and there will surely be several giants to look at besides not a few young ones in any forest of over 10 acres anywhere in our area except the northern border. Not hardy in the land of the spruce, however, its northern limit being about southern Vermont. Liriodendron belongs to the magnolia family and is our sole northern representative.

The linden is another lone representative of a large and distinguished family, but our American species is one of the finest. Judging by its scarcity we do not begin to appreciate it, for, with its fine proportions, its abundant, white, fragrant blossoms and odd fruit, it is a most fascinating tree to have about. And, as a bee tree it is unexcelled. With a few of them in your forest go ahead and set out your hives; the bees will never lack for honey flowers until your lindens are through. Leaves are of the characteristic linden, heart—shape with notched edges, going direct to brown in the fall, coming out late and dropping early. Fruit a small pea on the end of a stalk sticking out at an angle from a wing which grows sessile on the twig and enables the pea to float for some distance in the air, at least clear of the parent tree when falling. The European linden has been planted much among us but is quite vulnerable to insect attack while ours is immune. Both can be bought from nursery or transplanted from wild stock. Grows best in granite, limestone and clay base soils, in moist localities—anywhere that is favorable to hemlock, sugar maple, and white ash. The one I know best lived on my father's place, the soil base being red limestone clay, and the tree throve mightily, having a diameter of about 2 feet and a height of fifty-five.

The two gum trees are represented in nearly every forest, but are at their finest in sand base soils with a hardpan underneath keeping the soil wet and ferny. Both the sweet gum and sour gum, or tupelo, are striking trees, unique in every respect. The sweet gum grows straight as a lance in the forest, with a fine broad crown at the general height of the growth surrounding it; in the open it puts forth a multitude of side branches so that the columnar trunk is lost sight of, but the beauty of these branches more than repays. I would be chary, however, of clearing away too much around a forest sweet gum, for it at once puts forth a multitude of side buds up and down the trunk and the beautiful column is soon lost to view in a fuzzy coat of short branches. In the autumn the sweet gum is in its glory, for its characteristic star-shaped leaves go into the most gorgeous shades of deep red and purple, making it a plume of pure color that is a joy to look upon. For this reason young saplings transplanted from the nursery on the woodland borders of meadows and glades will be a good investment as they grow their side branches at the same time that they put on height and the result is a handsome broad tree always strikingly beautiful and positively gor-

AN EUROPEAN LINDEN

THIS IS ONE OF THE HANDSOME TREES FOR COUNTRY ESTATES OR PARKS, HAVING A HEAVY GROWTH AND GIVING AMPLE SHADE AS WELL AS ADDING GREATLY TO THE CHARM OF THE LANDSCAPE OF WHICH IT IS SO FITTINGLY A PART

THE SWEET GUM OR LIQUIDAMBAR
IN THE FOREST THIS TREE SENDS UP A PERFECTLY STRAIGHT COLUMNAR TRUNK, BRANCHLESS TO THE CROWN. IN FIELDS IT SPREADS AS SHOWN. THE HANDSOME FALL CORORATION, DARK PURPLE-RED, ADORNS ITS STAR-SHAPED LEAVES

geous in the fall. A very hard tree to move from its wild location in the forest but easily grown from seed, in fact if you own a field to the east of one or two sweet gums it will be a continuous fight to keep them from peopling your field with a thicket of their young, for the prickly balls which form the seeds are blown for several hundred yards from the parent tree and it seems that nearly all germinate. The reason is, of course, that this burr is but the receptacle containing several true seeds, at least one of which is sure to be

fertile. These burrs hang on as ornaments nearly all winter and will attract many a wandering troup of winter goldfinches and other hungry feathered citizens. The wood of the sweet gum is disappointing. It seems like such a perfect pole or post, and it peels as smooth as if finely sandpapered, but after a month or so it has warped and checked with so many deep cracks in it as to be entirely untrustworthy for any purpose whatsoever. Nature has been so lavish with this tree as an ornament that she evidently intended it strictly to remain so.

The sour gum is an odd, curious denizen of our forests, growing on any base soil provided that it is wet enough; prefers sand or clay base for its best developments. With us it reaches astounding proportions, 15 and 20 inches thick, generally hollow inside and much prized by gray squirrels as a rainproof and shot-proof home. Even when a mere sapling the sour gum shows its growth characteristics, which are to put up a reasonably straight trunk and then twist the top into a sort of flat umbrella with all the other branches drooping at their tips to match. One of the first signs of spring is the red leaf buds of the sour gum which are so numerous and noticeable as to make a red patch on the landscape wherever there is one of these trees. Its leaves are out early, and soon after come the flowers, green and insignificant, followed by the double berry of the fruit. In the fall this tree is a show. Its leaves turn a brilliant crimson, then spots of dark blue and blotches of purple appear, later the whole leaf gets a darker and more magnificent purple-black; finally a deep black, and then it falls to the ground, the whole process taking the month of October and part of November. Meanwhile its multitude of deep blue-black berries have attracted every robin in the fall flights and there they feast from morn till night. It is a hard tree to transplant and the nurseries do not offer it, but it is no trouble at all to get fine seedling on any site desired, not too dry, by planting a seed spot and saving the finest specimen resulting. They endure shade well, in fact we have millions of young ones under the parent trees in the Interlaken forest and the older trees manage to get a growth in spite of competition from the white oaks, red maples and sweet gums which abound, finally fighting their way up to a niche in the general forest cover. The wood is tough, white and strong, and is used a good deal in wood turning. Poor stuff as a fire wood; makes good backlogs.

Belonging to the same family as the sour gum are the two dogwoods, both interesting, and one of them, the flowering dogwood, one of the most beautiful objects in the forest. If Nature has not given you all the dogwoods you want, by all means plant in some as they will grow in any base soil not too dry, in fact I cannot recall a forest south of the spruce belt that has not its dogwoods. In the region of deep snows and intense cold it is sure to be winter-killed; anywhere that 10° below zero is an unusual occurence go ahead and plant in where wanted. Perhaps its most distinguishing characteristic, which it shares with the beech, is its ability to grow in the deepest shade, all its life, however, whereas the beech has to get out to sunlight sooner or later if it is going to make a tree. You can plant in dogwoods where you know well that they never may hope to have a patch of sunlight all to themselves, yet year after year the lovely white crown of huge flowers will greet you every May, and the handsome scarlet berries resulting will feed the robins every fall. The converse of this proposition does not follow, for the dogwood thrives equally well in the broiling sun. I am acquainted with two such, which are the only trees their owner boasts, yet his have a fine thrifty crown and an abundance of flowers. Not only that, but for variegated reds, purples and yellows in the autumn, commend me to the leaves of the dogwood bush. It takes an air brush in the museum laboratories to reproduce the shadings and mottlings of the autumn color of these dogwood leaves. The museum artists color the white wax imitation of the leaf a fine yellow, next they stipple on blue spots, and then sprinkle in some of red, and finally tip the leaf with purple, and at that will be somewhat

THE SOUR GUM OR TUPELO

NOTE ITS CHARACTERISTIC HABIT OF GROWTH, WITH FLAT-TOPPED CONTORTED CROWN AND DROOPING SIDE BRANCHES. IN THE AUTUMN ITS DEEP RED LEAVES MAKE IT A STRIKINGLY DECORATIVE FEATURE IN ANY FOREST LANDSCAPE

behind the gaudy natural leaf. Young dogwoods can be transplanted wild in late autumn, or a 5-foot nursery bush will cost you 50 cents; also easily grown from seed. Your dead dogwoods make excellent fire wood, also salable for fine wood work as it is very hard and pure white, the bark makes as good a febrifuge in medicine as the chinchona, and can be substituted for galls in making ink, while our Indians used to get a fine scarlet dye from the more fibrous roots of the young trees.

The "other dogwood" *cornus alternifolia*, has a leaf so like the flowering variety that you are sure it is a dogwood anyhow, but its flower is a cyme of small white flowerets, sometimes pale yellow, and the fruit is of blueblack upright berries on small reddish stems, altogether a different plant from the flowering dogwood. It is called the "green osier" in the country, and it

THE DOGWOOD

THIS TREE WITH ITS PROFUSE WHITE BLOSSOMS IS ONE OF THE MOST ATTRACTIVE IN THE SPRING AND THE EARLY SUMMER AND IS A GREAT FAVORITE WITH THOSE WHO LOVE THE FLOWERING TREES

loves to get its roots into a brook, in company with alders and other wet footed bushes. Though sometimes offered by nurseries it is subject to blight and is best left to nature, that is, if she has but one in your brook give thanks and spare the ax, otherwise it is hardly worth importing.

While we are on watery subjects let's get acquainted with our various willows, though only two of them will bear extensive mention here. Owing to several useful varieties, notably the golden osier and the weeping willow, having been brought to America by the early colonists the tree tyro is apt to become very much confused in attempting to identify the species encountered on his own property. The golden osier, *S. vitellina*, is the dam willow, noted for

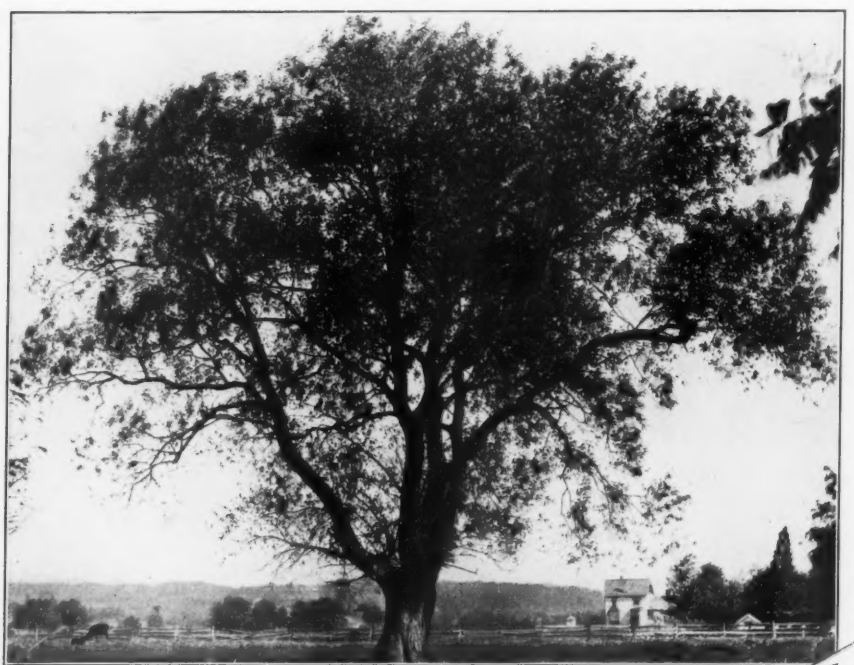
its quick and vigorous growth from live stakes cut from growing trees. One of the first leaves to appear in the spring (as are also the black and pussy willows), turning yellow in the fall, usually very late, among the last down. Identified by the light yellow branches noticeable in the spring by a yellow blotch along the stream side, before any leaf is out and the first sign that the forest is waking up. The weeping willow, *S. Babylonica*, is a familiar exotic, now at large in this country growing wild. Known by its long drooping twigs, 10 and 12 feet long. Among our native indigenous willows, the black willow is most common, seen everywhere along stream sides and in swamps and ponds, noted by its dark, almost black bark and narrow leaf with the rounded base; also by its habit of growing in clumps. Out west we have a willow called the "anglers misery," or sand-bar willow which grows wherever there are trout and aids materially in keeping up the trout supply by making it impossible to land one without going overboard through the willow stems which crowd the stream bank. Not common in the east. For the owner of an estate the weeping, osier, black and pussy willow are enough to work with, and surely there is no finer water decoration than these same trees. Seton tells of the golden osiers on the dam at Wyndygoul which eight years ago were mere twigs and are now fine vigorous trees. I have seen and admired them and as I recall it they are now about 6 inches through and some 25 feet high. In his new place, The Finchery, he has been able to get splendid island effects from an erstwhile marsh by piling the dredgings about clumps of black willows of venerable age and now glorious in their island setting of lake water. *S. Babylonica* does best on stream and lake banks where it can festoon its long plumes over the still waters beneath and charm every beholder with the reflected beauties of its foliage. All the willows spread themselves about the country by dropping their twigs into the stream, whence they are carried on down until they find a lodgment in some mud bank and take root forthwith. The seeds ripen in July in tiny capsules replacing the flowers in the catkins and are blown far by the wind. Nature's way of spreading the species when a willow grows, as it often does, in a wet burr grass meadow with no actual water anywhere in sight. Nursery specimens of *Babylonica*, 8 to 10 feet high, cost about 75 cents and of golden osier, 4 to 5 feet, 35 cents.

THE FLOWERING DOGWOOD BLOSSOM

Our two wild cherries next claim attention. No forest is without them, as the poorer the soil the more wild cherries on it. Any base soil, especially for *serotina* though it does its proudest on sand base. With us it makes a tree about 40 feet high and a foot through, though I have seen it in Maryland and Delaware much larger. In May the fragrance of its blossoms is one of the olefactory delights of the woods; a whiff of breeze just off a wild cherry tree in full bloom is a thing to make you stop and go back to get more of it, no matter how pressing the busi-

ness in hand. The two cherries, *Pennsylvanica* and *serotina* are easily identified because the first has two small cherries on long stems exactly like our cultivated cherry, and the second has a raceme of berries something like a grape cluster. The nurseries do not offer any but flowering exotics, but either cherry grows easily from seed. Collect and pile the pits in sand, proportion of one to four, during the winter and plant in the spring. Be careful not to let them sprout, for the cherry sends down its root and puts up its cotyledons simultaneously so that it must keep on growing where it sprouted, for to sow a seed that has already put out its root is to kill the cotyledons or first leaf growths and so kill the plant. Some fanciers take the risk of planting in nursery beds in the fall, but they are quite apt to be eaten by mice or dug up by the birds. If kept in sand through the winter, first being cleaned of the outer fruit envelope, they will sprout at once when sown in the spring. In both of the cherries the wood is very valuable for furniture making, and the bark is handsome to look at when the tree is alive, leaves turn a fine yellow in autumn and the berries feed all the migratory birds that pass your way. In location *serotina* prefers a moister soil than *Pennsylvanica* and occurs over our whole area, while the latter takes the high ground and is only found wild in the northern part of our range. Its principal enemy is the tent caterpillar, which will seek out and kill every wild cherry in a whole county if not checked. As these ccatures live in big colonies in their tent and go out all together in droves to feed, it is not a hard matter to observe when they come home and then burn up the whole colony in their tent with the asbestos torch.

Two more trees, and then we must leave all the others, regretfully enough,



THE YELLOW WILLOW

INTRODUCED FROM EUROPE, NOW INDIGENOUS ALL OVER THE COUNTRY. THE OSIER FOR POND DAMS. ORNAMENTAL IN BRANCHES AND LEAVES THROUGHOUT THE YEAR. WILL GROW EASILY AND QUICKLY FROM SHOOTS WHEREVER IT CAN FIND WATER

but a book of twenty volumes could be written about our American wild trees and then there would still be a lot to discover about them—and we have a whole chapter of the more important evergreens awaiting us. Our fine American chestnut must have a mention. Restricted in range to the Ohio basin and the Atlantic States, it is fast being exterminated in the latter by the famous (or infamous) blight which has swept over the country in the last four years. There seems to be no cure as yet discovered, though I have heard ordinary Bordeaux mixture well spoken of by those who have experimented with various remedies. Most of the experimenters are looking for something that will do for wild forest conditions, and reject Bordeaux on the score of expense. On an estate however, the expense of spraying all the trunk of a big chestnut with Bordeaux would not amount to very much, not over 80 cents a tree including labor and material, and if it will work let us try it. The blight has not struck us yet in the Interlaken Forest, but it has been three years since we have had a decent fall of chestnuts, and in 1911 the whole crop was wormy. The next generation will problably have chestnuts again, for the fungus blight will have spent itself, as such things do, and the bird conditions ought to be better so that every chestnut is not stung and ruined by some damned fly or other, with no kingbirds or great crested flycatchers

THE COMMON BLACK WILLOW

ONE OF THE FIRST OUT IN THE SPRING. NATIVE ALONG STREAM BANKS AND ORNAMENTAL THROUGHOUT THE YEAR. NO GOOD FOR WHISTLES

perched in the tree tops to nab him in the act. All our soils, granite, limestone, clay and sand seem to suit the chestnut equally well, as I believe that no section can show any larger or finer trees than any other. Just why it will not grow in Southern Michigan, for instance is a little puzzling but out there as eastern chestnut is a rarity, while further west it is unknown. I believe it is purely a matter of the distribution of so heavy-seeded a tree as the chestnut, and if planted it would succeed.

Last tree of all, the head of the family, the beech. Grows over our whole area extending to just west of the Mississippi. The seed, a three-cornered nut about half the size of a chestnut. The tree, one of the most magnificent giants of our forests, a great, smoothbarked fellow, with a huge round crown of small green leaves, turning yellow in the fall and then staying on all winter in russet brown where they give a fine note of color against the white snow. When young, beech will endure shade to an enormous extent, and it forms one of the principal saplings in the undergrowth. Luckily they must have sun later or perish, or else soon all our forests would be pure beech,—which God forbid. However, the yearly leaf fall from these young trees helps the soil humus even though the roots of these same trees rob the larger ones of

THE AMERICAN BEECH

ONE OF THE GRANDEST TREES IN OUR FORESTS. WITH SMOOTH GRAY TRUNK AND PERSISTENT YELLOW LEAVES IT IS ALWAYS AN ORNAMENT IN EVERY WINTER FOREST LANDSCAPE

their rightful moisture, so that in Europe the standard way to enrich the soil of a forest is to grow pure beech on it for a revolution—100 years. We have not reached that stage yet so I am not in favor of allowing the forest to be cluttered up with a tangle of worthless young beech saplings, preferring to extend the available moisture upon the older trees, since we are well off in the matter of humus. But, as a landscape feature, particularly on lake banks and ravine slopes, let us encourage the large beeches and the thrifty half-grown ones, because of their picturesque beauty. And that exotic cousin of our beech, the copper or purple beech, is now offered so cheaply by nurserymen and grows so quickly into an object of striking beauty, that any forest will be enriched by the planting of a few of them at salient points. As to soils, both beeches take any base and any locality you choose to offer them. Huge specimens can be found in rich ravine slopes, in swampy fern bottoms, on high dry ridges, in clay, granite, limestone and sand soils, so it seems to matter not at all to the beech where you put it so that the soil is not arid, such as is used by pitch pines and gray birches. In wet soils young beeches will do well in full sunlight, otherwise they need older trees overhead as they will not stand being dried out. A full grown beech, one of the big kind with a 3-foot trunk, exhales 10 tons of water daily through its leaves, and all this must come up through the myriads of feeder roots down in the soil—giving you some idea of the amount of water actually handled by trees.

FOREST CONFERENCE IN THE WHITE MOUNTAINS.

THE Annual Forestry Conference in the White Mountains, under the auspices of the Society for Protection of New Hampshire Forests, and of the State Forestry Commission, will take a broader scope this year, and bring together the agricultural interests and the forestry interests, as far as possible, of all of the New England States, together with officers of the American Forestry Association who will ask the cooperation of New England organizations in their association's effort to secure the passage by the next Congress of an appropriation of $10,000,000 for the purchase of forest reserves in New England and the Southern Appalachians.

The chief topic will be the problems of small woodlands and the farmer's woodlot. There will be discussions on planting, thinning, marketing small bodies of timber, and taxation of the woodlot, together with demonstrations by experts of planting, thinning, felling and skidding trees. The meetings will take place at the Profile House in Franconia Notch beginning on the evening of September 1, and continuing through the second and third. This hotel and neighboring hotels and boarding houses make special rates.

To a meeting of this scope the Boston Chamber of Commerce, through its agricultural committee, and the Western New England Chamber of Commerce, are lending active cooperation. Mr. Henry S. Graves, Chief of the Forest Service, and Professor J. W. Toumey, Director of the Yale Forest School, are among those who will speak for the foresters. President Kenyon L. Butterfield of the Massachusetts Agricultural College, and Dr. Edward T. Fairchild, President of the New Hampshire State College, are among those who will speak for the agriculturists.

BROOKLINE PROTECTS BIRDS

By CHARLES B. FLOYD, *Vice-President the Brookline, Mass., Bird Club.*

[Mr. Floyd here tells how necessary is the encouragement of bird life in order that they may battle against the insects which every year destroy many millions of dollars worth of trees, shrubs and plants. He also describes how carefully Brookline, Mass., protects its birds and the success it has had in so doing.—EDITOR'S NOTE.]

THE study of birds among old and young has increased all over this country at a marvelous rate since the various State Audubon Societies began their efforts to arouse the people to the enormous losses caused by the ravages of insects. These pests have multiplied in numbers until they have become overwhelming; owing to the fact that the birds which would ordinarily hold them in check have been slaughtered to such an extent that the balance of nature has been upset.

The public is slowly beginning to know that man needs and must have the birds to protect his fields, orchards and shade trees, night and day, or they will be destroyed. All the devices and inventions yet produced are unable to cope with the outbreaks of insects which occur continually in all parts of this country; for the insect literally dominates the earth.

Instances can be cited where large flocks of birds have destroyed huge swarms of insects and saved men from ruin and possible starvation. When one is reminded of the fact that there are over 300,000 "vegetation eaters" known to scientists, and probably twice that number still unknown, that these pests feed on practically all varieties of plants, and that with their reproductive powers a single pair like the gipsy moth can produce enough young in eight years to destroy all the foliage in the United States, it is not over estimating the situation when I repeat that the insect dominates the earth.

Their destructiveness is due to the amount of vegetation they ruin for they actually eat their way through their short life. A gipsy moth whose length of life is twenty to thirty days will devour three-quarters of a pound of leaves. If this seems a small amount try weighing a pound. As this hairy destroyer consumes the leaves of a tree the tree's means of breathing and taking in nourishment are removed. The tree becomes weakened, month after month, and finally dies from attacks of borers and bark beetles. Some insects in the larvae stage are able to bore into the hardest wood. Not all insects, however, live on vegetation, some eat only the dead. The latter do no harm. The foliage is not subject to the attacks of a few varieties of insects, such as the gipsy, brown tail and leopard moths but new species are constantly appearing that injure trees and crops. Over 400 known varieties of insects prey on the oaks, 176 attack the apple tree, and about the same number live on the plum, peach, pear and cherry trees. One-tenth of the value of the crops of the farmers, market gardeners, and orchardists are lost each year. As the forests are cleared away the natural plant food of the insects grows less and less so they turn to the crops, gardens and fruit trees for sustenance and cause an increasing loss each season. In certain places in Massachusetts the devastation by insects has been so large that the State has been unable to check it, and after abandoning the attempt, the birds have not only stopped but wiped out the scourge. When such out-breaks occur the birds quickly gather to feed upon the insects, for their food is then plentiful and easy to obtain.

The career of the gipsy moth in Massachusetts will illustrate how quickly one of these plagues can gain a foothold and increase with terrible results. In 1868 or 1869 this moth was introduced into Medford, Mass. Twenty years later it had grown to such numbers that it was alarming the community. By 1890 the legislature was asked for

assistance in eradicating it and $50,000.00 was voted for that purpose. During the next ten years $1,000,000 was spent in the fight by the State and much more by private individuals. The year 1905 saw the brown-tail moth, which had lately been planted in Somerville, also overrunning the country and $300,000.00 was appropriated to exterminate the two. By this time the gipsy moth had spread into Rhode Island, New Hampshire and Connecticut and the brown-tails were following. Much money is still being spent to destroy them.

The insects which have been imported grew much more rapidly here than in their native country; for their natural enemies are left behind, our birds have to learn to eat them; and everything that grows is food for them. The yearly loss to the farmers is very great. As long ago as 1868 it was estimated that the country suffered to the extent

STUFFED SPECIMENS OF LAND AND WATER BIRDS

SHOWN AT THE BROOKLINE, MASS., EXHIBIT. THERE ARE ALSO PORTIONS OF TREES SHOWING NESTS OF THE TENT CATERPILLAR, GYPSY AND BROWNTAIL MOTHS, LEOPARD MOTH AND WOODLICE AND SAMPLES OF THE BENEFICIAL WORK OF WOODPECKERS AND FLICKERS

of two billion and a half. In 1890 the loss had increased one billion dollars. The year 1901 witnessed a loss of over three millions of dollars in Massachusetts alone.

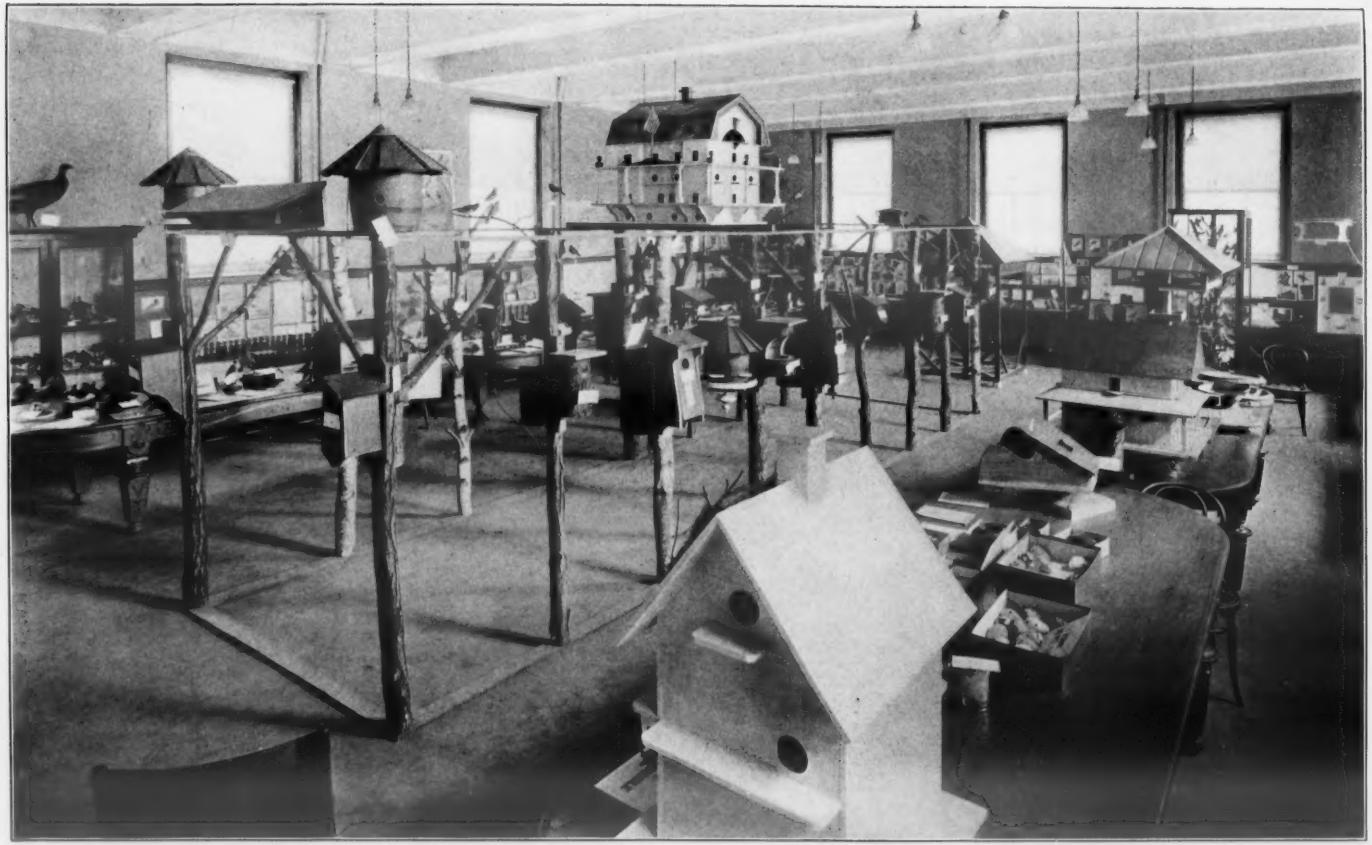
The insect, its eggs and young are the natural food of many birds, and the amount they and their young consume is astonishing. The young eat as much in proportion to their size as their parents do. A young robin has been known to eat one-half its weight in meat a day in captivity, and from fifty to seventy cut worms and earth worms a day. The stomachs of two flickers that were examined were found to contain 3,000 and 5,000 ants respectively. One night hawk had eaten 500 mosquitoes. A yellow billed cuckoo, eighty-two caterpillars, another eighty-six caterpillars. Two scarlet tanagers ate thirty-five gipsy moths per minute for 18 minutes. It is estimated that 21,000 tons of insects are eaten each season in Massachusetts.

Birds are able to consume large quantities because their digestive organs are particularly large and powerful. After the stomach is full the gullet can be filled and anything not readily digested ejected from the mouth. Their strong bills crush the shells of the harder insects and as the process of digestion is rapid, and their appetite insatiable, it is not surprising that they consume almost incredible numbers of the leaf eaters. At all seasons, day and night, the birds are searching the trunks, branches and twigs of the trees for eggs, larvae and the insects themselves. Under the trees, on the ground among the leaves and in the grass, towhees, sparrows and thrushes search for the pests. In holes in the trunk and bark the woodpeckers, nuthatches, creepers and flickers hunt and drill. Along the limbs and out on the twigs kinglets and chicadees explore eagerly. Warblers and vireos search the trees from top to bottom, and flycatchers dart from their perches to seize the insects in the air. All these work from dawn until dark and at night-fall, when the swallows have left the upper air, the night-hawks and whip-poor-wills carry on the relentless pursuit.

It will be seen from the foregoing that the birds are among man's greatest benefactors. Laws have been made by both State and Federal Legislators for their protection. This, however, is not enough. The Forestry Department of the town of Brookline, Mass., has recognized the place the birds fill in the care of trees, shrubs, plants and foliage of all kinds, and steps have been taken to protect, encourage and care for all that live within the town limits.

Brookline has been as hard hit by the work of the gipsys, brown-tail, leopard moths and elm beetle as any of her neighbors. In 1908 the town was the worst gipsy moth infested district in New England. Today the gipsys are well under control and due recognition of the work of the birds is made. The task of destroying the winged pests has been carried on in several ways. The department was thoroughly re-organized and equipped. It built its own spraying machines which are the largest of their kind in the United States. Where once the apparatus then in use took the entire season to spray the trees on a street like Beacon Street, the work now can be done in 2 hours. Besides this treatment the men of the department cut out all dead limbs, examine and prune the trees where needful. Electric and telephone wires and horses are not allowed to mar this tree property of the town any more than its fine public buildings.

When the foresters go through the town removing dead limbs and trees they take away the natural resting places of many of the most useful birds, such as the flickers, woodpeckers, chicadees and nuthatches. Proper resting suites then had to be furnished to keep the birds about the town, and accordngly 300 nesting boxes were placed in suitable locations for them. Each box was numbered on the bottom so that it could be easily seen from below, and its number recorded on a map in the office of the Forestry Department. Records were thus kept of the number of homes occupied and the species using them. The results have been satisfactory.



BROOKLINE, MASS., BIRD EXHIBIT IN THE PUBLIC LIBRARY

HERE ARE DISPLAYED NESTING BOXES, FEEDING BOXES, BATHS, NESTS, EGGS, PICTURES, CHARTS, BOOKS AND PAMPHLETS AND PRACTICALLY EVERYTHING ON THE SUBJECT OF APPLIED ORNITHOLOGY. THE EXHIBIT WAS VIEWED BY SEVERAL THOUSAND MEN, WOMEN AND CHILDREN

The question of food is one which governs the habits and actions of all birds. As the town has grown and its open places have been built upon the birds have been forced to seek new feeding grounds. Of course most birds migrate twice each year but some remain here all winter that in the natural order of things would go south. To keep the birds about during the cold months, 150 feeding stations were selected and after every snow storm or rain storm, when a sudden freeze has covered the trees and ground with ice, grain and suet are placed at these stations. Thus the birds are provided for until a thaw releases their natural food. The man whose duty it is to place the grain and suet states that during the heavy snow the pheasants came out of the woods when he called to them and crows actually followed his sleigh from station to station.

Superintendent Lacy, his men, and members of the Brookline Bird Club all report a noticable increase in bird life throughout the town. More birds have wintered there that generally go south than have for many years. Large flocks of juncos, white-throated and song sparrows have passed the winter in good health, and even hermit thrushes, a brown thrasher and grackle have been seen all during the cold days. Through the efforts of the town's bird warden, Brookline is now a bird sanctuary. The holders of large estates, among them those owned by Messrs. Sherman Whipple, Louis and Walter Cabot, Ernest B. Dane, Franklin Huntress and Alfred Douglas have agreed to prohibit all shooting upon their property and have posted notices to that effect. When the hunting season opens the woodlands of the town and the private estates will be policed and patrolled by men of the Forestry Department to guard against gunners and all pot hunters as well as fire.

To stimulate interest throughout the town in this important and necessary work an exhibit of everything connected with the subject of applied ornithology was recently arranged at the Public Library. Stuffed specimens of land and water birds from private and state collections were displayed. Nesting boxes, baths, feeding boxes, nests, eggs, pictures, charts, books and pamphlets of illustrations, cases of injurious insects, grain and seeds that the birds feed on, and samples of the bird work done in the elementary schools were arranged. Portions of trees showing nests of the tent caterpillar, gipsy and brown-tail moths, limbs with evidence of the work of the leopard moth and wood lice, and samples of the beneficial work of the woodpeckers and flickers were shown. Portions of fifty varieties of berry-bearing shrubs were placed on the walls against a back ground of green paper and nearby were lists of vines and bushes to plant to attract the birds. This interesting display was viewed by several thousand adults and many children.

The National Association of Audubon Societies has established a Department of Applied Ornithology under the direction of Mr. Herbert K. Job, former State Ornithologist of Connecticut, because of so many inquiries for information pertaining to work, such as has been outlined.

It is to be hoped that other towns will soon follow the lead of Brookline in their forestry work and give the birds the protection and care which is their due.

ORNAMENTAL AND SHADE TREES

A Department for the Advice and Instruction of Members of the American Forestry Association.

EDITED BY J. J. LEVISON, B. A., M. F.

Arborculturist Brooklyn Park Department, Author of "Studies of Trees," and Lecturer on Ornamental and Shade Trees, Yale University Forest School.

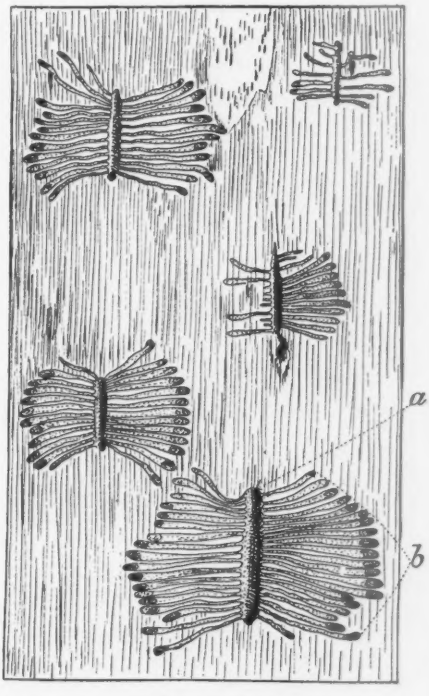
HICKORY TREES THREATENED WITH DESTRUCTION

ARE we to lose our hickory trees in much the same fashion as we have already lost our chestnut trees? Unless municipalities and the owners of woodland property will do something in a concerted way to protect the hickory trees, we shall lose them soon. Thousands of hickory trees are already dead all over Long Island and for hundreds of miles north and northwest of New York City.

The enemy is the hickory bark borer, officially known as "Scolytus quadrispinosus" which is a small black beetle that bores in the inner bark of the tree and then girdles the tree with a series of galleries preventing the flow of sap. The insect works at a comparatively fast speed and often trees die in the same year they are attacked by the borer.

From October to early May the borer is a grub located in small galleries in the bark. Through the winter it gradually enlarges these galleries until it has completely encircled the tree. This period of the insect's life is the best time to check the spread of the trouble. Working underneath the bark, the insect is naturally inaccessible for treatment except by cutting the infested trees down and burning the bark. If the infested part of the tree or the whole tree is burned at this time, the colony of borers will be destroyed before they have a chance to enter other trees and begin work on them. It is by working against the insect during this period that we have been successful in saving the hickory trees in Prospect Park, Brooklyn—while every other method has failed and the hickory trees all around on the outside of the park have died.

From early May through June the grub emerges in the form of a beetle. Then it feeds upon the stems and bases of the young leaves of the tree. The writer has tried to spray the hickory



WORK OF THE HICKORY BARK BEETLE

THIS IS THE SURFACE OF THE WOOD BENEATH THE BARK SHOWING (A) THE PRIMARY GALLERY AND (B) THE LARVAE MINES

trees at this period with arsenate of lead at the rate of 1 pound to 10 gallons of water in order to poison the beetles in their process of feeding. This method has probably been of some service but can be little depended on and the salvation of the hickory trees really lies in the rapid, timely and absolute destruction of all infested bark.

INSIDE THE BARK

INNER SIDE OF HICKORY TREE BARK SHOWING PARENTAL AND LARVAL GALLERIES AS DIAGRAMED IN THE FIRST ILLUSTRATION IN THIS ARTICLE

After the period of feeding, the beetle bores small holes into the trees in which it deposits its eggs. These eggs hatch out into grubs and the life cycle of the insect is repeated. The presence of the insect can be detected by the small holes in the bark of the tree and the fine sawdust which is ejected from these holes when the insects are active. These holes, however, will not be noticeable until the insect has completed its transformation. In summer, the infested trees show wilted leaves and many dead twigs. Holes in the base of the petioles of these leaves are also sure signs of the workings of the insect. At the present time the mature beetles are emerging from the infested trees and soon it will be time for those interested to select the hopelessly infested trees, mark them for removal and cut them down in winter. The hickory wood is heavy, hard and strong and that of the removed trees sufficiently suitable for agricultural implements, carriages and wagons, for fuel, telephone poles, ties and posts.

The hickory bark borer is an old enemy in this country but has never before been serious enough to cause special comment. Now it is serious enough, in the vicinity of New York, at least to cause alarm. It was observed as early as 1867 and has since then been studied by entomologists in many parts of the country. In 1903 a serious infestation occurred at Belle Isle Park in Detroit, Michigan. All the hickory trees there were threatened with destruction and only a timely cutting down of the infested ones saved the rest. The felled trees were sold and covered the expense of the cutting.

The writer first observed its presence on Long Island at Prospect Park in 1906. He then obtained the personal assistance of Dr. A. D. Hopkins, Chief of the Division of Forest Insects in the United States Bureau of Entomology and of Dr. E. P. Felt, State Entomologist of New York. We then experimented with numerous methods of eradicating the borer and finally came to the conclusion that the most practical way was to remove and burn the infested trees before the month of May. Accordingly we cut out and burned all the badly damaged

trees and limbs from Prospect Park and kept up the examination and elimination until we reached the point several years ago where we had no dead hickory trees in the park. Previous to that time there were from two to three hundred hickory trees dead annually in the park. Today we have some splendid specimens of hickory trees in the park, not at all infested, while all around us thousands of hickory trees are either dead or dying.

QUESTIONS AND ANSWERS

[AMERICAN FORESTRY invites its readers to send any questions they desire to this department and they will be gladly answered and without delay.—EDITOR.]

Ques.—I enclose picture of a fine oak to which horses are constantly tied, but which I hope to protect with wire. Would like to know if we can cure the diseased spots already affected. The spots in the center of the picture, just above the horse's nose, are the worst places, and I have seen bugs or ants coming out in numbers. Could a novice do anything at tree surgery through advice by correspondence? Could any acid treatment be applied to arrest decay? I am quite anxious our town should have a Tree Club but so far efforts have failed. The tree shown in the illustration is in the center of a side street where it makes a welcome shade, as shown by use.—J. A. T., Asheboro, N. C.

A.—For ants or grubs, inject carbon bisulphid with a syringe or squirt can and immediately after the injection is made clog up the holes with soap in order to retain the deadly fumes generated by the carbon bisulphid within cavities. Then cover the wound with coal tar and place around the tree a guard made of wire netting of ½-inch mesh. The work can be done by an amateur as well as by an expert.

When you are ready to start a tree club, consult this Department. We are ready to tell the results of experiences along these lines in Brooklyn, Newark, and other cities and we can furnish you with suitable literature on the subject.

Q.—I have a big oak tree on my property here in Hoboken, and the tree, while a great ornament to my place, shows of late signs of sickness, the top branches seeming to die out, and I wish to find out what can be done to save it, if possible. Shall be glad to have you advise me.—C. M. B., Hoboken, N. J.

A.—Dead branches in an old oak tree may be the result of various causes of deterioration. The tree may be suffering from a fungus disease on the

EXIT HOLES IN HICKORY BARK

THE HICKORY BARK BORERS, WHICH HAVE DEVELOPED UNDER THE BARK BORE THEIR WAY OUT THROUGH SUCH HOLES AS ARE HERE SHOWN

trunk, from a root disease, from mechanical injury to roots or bark, from old age, neglected wounds or a foreign element in the soil. A personal examintion, or a much closer description would be required to make this advice more specific. The remedy would vary with the cause.

THIS SHOULD NOT BE DONE

WHEN A HORSE IS HITCHED TO A TREE IT IS ALMOST CERTAIN THAT THE TREE WILL BE INJURED AS IS THE ONE IN THE ILLUSTRATION. THIS REQUIRES SURGICAL TREATMENT TO SAVE IT FROM DISEASE AND FROM ROTTING

Q.—Am sending you small pieces of pine for examination. They appear to have small drops of sap upon them, but when this sap is opened you will find from one to four small red bugs. I have ordered the tree cut and burned, but am afraid it is something that might spread to the other trees. What can be done to combat this evil?—D. C., Brooklyn, N. Y.

A.—The specimens of pine branches sent showing masses of pitch containing small yellowish insects have been examined. This is commonly met with at this time of the year on scrub and other pines. It is due to the pitch maggots which are the larvae of small gnats belonging to the family *Cecidomyidae*. The insects only occur for a short period and as a rule do no damage to the trees. You are not justified in cutting down trees on account of the presence of this insect, or going to the expense of any other treatment.

Discussion of the following questions is requested by the readers of AMERICAN FORESTRY, and expressions of opinion, addressed to the Editor of this Department, will be appreciated.

1. How shall we determine what sections of a city should be included in the "Treeless Zone?" To what extent should business houses and commercial traffic across footways influence this?

2. What can be said for and against the following practically untried trees for street and highway purposes?

(a) Kentucky Coffee Tree (Glymnocladus dioicus).
(b) Willow Oak (Quercus phellos).
(c) Hackberry (Celtis occidentalis).
(d) Yellow Wood (Cladrastus lutea).
(e) White Ash (Fraxinus Americana). Consideration of these species is invited with special reference to use in latitudes between New York and Richmond.

Q.—We have here 20 acres of woods, containing pine, chestnut, maple, birch, oaks, etc. Many of these are fine large trees, but the woods have been neglected for many years. We are anxious to improve and beautify them. The sun has not reached the ground in these woods for a generation and I wish you would send me your advice as to clearing them for beauty, not for commercial uses, citing the best article or book for the care of such a small, valuable wood. —R. G. D., Whitinsville, Mass.

A.—To care for the woodlot in order to promote its greatest aesthetic value, we would suggest the following treatment:

Mark all the dead and diseased trees in the fall before the leaves drop and remove them in winter. See that the ground is free from brush and logs, but do not disturb the young growth and leaf mold on the ground. Remove the poor specimen trees that absolutely

interfere with the proper development of the better ones, but in doing this bear in mind that it is better to have the woodland a bit overcrowded than too open. The ground in a woodland should always be well covered with trees and shrubs in order to prevent drying out of the soil, in order to conserve the moisture in the ground and in order to hasten the decomposition of the leaf mold. Where there are big open gaps, you should plant little trees—white pine, red oak and beech. You can get these from the State Forestry Department or from a forest nursery at a very small cost. There should be numerous paths, about 6 feet wide, passing through the woodland in all directions. These would serve to make the woods accessible and would provide suitable barriers (fire lanes) in case of fire. For detailed information on this subject, see the chapter on "The Care of Woodlands" in a book known as "Studies of Trees" published by John Wiley & Sons, New York City.

Q.—Would you kindly give me information regarding the tree troubles represented on the enclosed leaves:

The sugar maple from which this leaf was taken is a lawn tree 35 years old. Has shown no signs of blight previous to this year; its neighboring trees of same variety are O. K. This tree is badly affected in the lower half of its top and on the inner branches.

The Norway Maple leaf was handed to me for my advice, I did not see the tree but the galls do not appear serious, but the party wished further information.—M. S. B., Y. M. C. A., Wilmington, Del.

A.—The leaf of the sugar maple shows evidence of drouth. This may not be due directly to the lack of water but may often be due to some root trouble or similar incapacity to take in sufficient water. Frequent watering and cultivation during the summer and a heavy mulch of well decomposed manure in late Fall would help to prevent a recurrence of this difficulty. Most of the sugar maples on Long Island suffer from drouth.

The galls on the Norway maple leaf are of practically no consequence and may never again re-appear.

NOTES

We are very much in need of tree men, and desire to get in touch with men who are able to handle this sort of work. They will be employed for permanent work on monthly pay-roll with wages from $50 to $250 a month. Please address immediately William H. Forman, Forman's Forestry Company, Commercial National Bank Building, Washington, D. C.

WIRE TREE GUARD

TYPE OF TREE GUARD WHICH IS NOT ONLY INEXPENSIVE BUT IS ATTRACTIVE AND IS QUITE EFFICENT IN PROTECTING THE TREE. IT MAY BE EASILY PLACED AND READILY REMOVED

City Forester, R. Brooke Maxwell, of Baltimore, writes: "There has been a considerable amount of speculation recently among foresters and others interested in trees regarding the possibility of growing the Pecan (Hickoria Pecan) in this part of Maryland or as far up the Atlantic coast as Baltimore.

The Division of Forestry of this

city has just completed the removing of what I consider to be the largest Pecan tree in the State. The tree measured 32 inches D. B. H. and was approximately 85 feet tall. The tree was between 90 and 100 years of age. It was found growing in a back yard in one of the oldest sections of the city. I could not get any information regarding the fruiting of this tree, but as far as growth is concerned better results could not have been asked for. Other information regarding the Pecan in Maryland would be interesting."

Mrs. J. M. Clark of Cohasset, Mass., writes: "We are on the firing line of the gypsy moth, and we have destroyed 500 tent caterpillar nests this season, so far. The fight has been on since the last of April."

ADVICE FOR THE MONTH OF JULY;

1. Cultivate and water all plants set out last spring.

2. Spray for leaf-eating insects. Use arsenate of lead of standard brand at the rate of about 1 pound to 10 gallons of water.

3. Spray for plant lice on beech, maples, etc., with whale oil soap at the rate of 1 pound to 5 gallons of water.

4. Remove all broken branches and dead branches of larger size. Cover the wound with coal tar.

The San Francisco Meeting

That a large number of members of the American Forestry Association will attend the meeting at the Panama-Pacific Exposition in San Francisco on Wednesday, October 20th, is evident. Not only will there be the members from California, Washington, Oregon and other Western States, but a number of members in the east will so time their intended trip to the Exposition that they will be enabled to attend the Association's meeting.

The whole week of October 18th will be devoted to Forestry and Lumbering and the program, owing to the great importance of the lumber industry on the Pacific coast, should attract wide attention.

The week's program will be:

Monday, October 18—Meeting of the Society of American Foresters.

Tuesday, October 19—Meeting of the Western Forestry and Conservation Association.

Wednesday, October 20—Meeting of the American Forestry Association.

Thursday, October 21—Meeting of the Pacific Logging Congress.

Friday and Saturday, October 22 and 23—Members will visit by special train the famous redwood logging camps near Eureka, returning to San Francisco Saturday night.

Members of the American Forestry Association who expect to be in San Francisco for the meeting will kindly notify the Secretary so that additional particulars may be sent to them.

The program will be announced shortly.

NEW ENGLAND'S FEDERAL FOREST RESERVE

By PHILIP W. AYRES

[The American Forestry Association, with a number of influential organizations in New England and the Southern Appalachians cooperating, will earnestly advocate the passage by Congress of a bill providing an appropriation, under the Weeks Law, of $10,000,000 to continue the purchase of Federal Forest Reserves in New England and the Southern Appalachians. Delegates representing the associations will confer with Secretary of Agriculture Houston on the subject in Washington on Wednesday September 22 at 10 a. m.—EDITOR'S NOTE.]

THE Weeks Act, for the purchase of forest land at the head waters of navigable streams, is one of the great measures in the country's history. It is like the irrigation act that is making fertile fields from the desert land, or the Smith-Lever Act that brings agricultural instruction to the farmer's door, or the Morrill Act that fifty years ago established the State Universities. This measure if adequately carried out will in large measure safeguard the navigable stream from disastrous erosion and provide a timber supply to replace our vanishing material for houses, furniture, tools, etc. It accomplishes this through the purchase of forest lands by the Federal Government. General in its terms, it applies to all parts of the country, but is limited in action to those States that pass enabling acts inviting the Federal Government to acquire land within their boundaries. Maine and New Hampshire at the North, and eight States at the South have enacted the necessary laws.

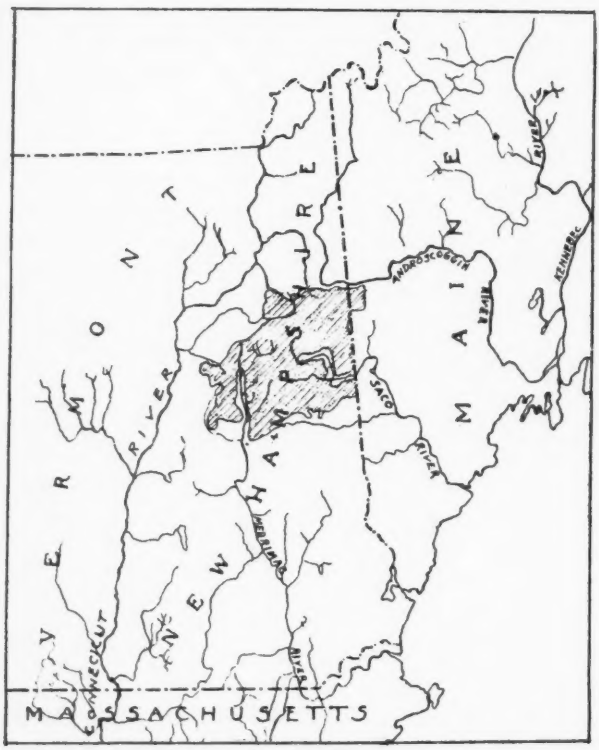
Because the West is fairly well supplied with National Forests, the officers of the Government have applied the first appropriation under the Weeks Act exclusively to the eastern or Appalachian Mountains. The wisdom of this decision becomes apparent when it is realized how great are the timber reresources of the West and how depleted are those of the East.

Population is increasing at an unprecedented rate. One million new souls are added to our country every twelve months. Our timber resources, taking the country as a whole, are consumed far more rapidly than they grow. It is not difficult to see the end of this process. The timber scarcity is already evident in the increased prices of everything made of wood. A house, a wagon, or even a rolling pin, costs twice as much as a few years ago. The need for action on a large scale is fully apparent.

The Weeks Act, signed by President Taft in March, 1911, carried an appropriation of $11,000,000, of which only $8,000,000 became available. Three-million dollars of this appropriation have never been taken from the Federal Treasury. The reason for this is that by the terms of the measure itself three separate departments of Government must exercise supervision over each purchase, and before any tract is finally taken it must be approved by the National Forest Reservation Commission. Before these several departments could be coordinated into a working force and the new board organized, the time specified for the use of the first part of the appropriation had gone by. Indeed, the time for using the first million dollars expired before the measure had gone through all of the weary acid tests of Congressional committee opposition. Meantime plans had been made for the larger expenditure, which plans now await the further action of Congress.

By the terms of the Act the appropriation covered a period of five years, and terminated by limitation on June 30, 1915. This was an experiment. It has been worked out successfully. Shall it be renewed? To carry out its beneficent purpose the operation of the law should be made continuous, until the great body of wild mountain land throughout the country has been placed

beyond the ruinous reach of private exploitation. With more far reaching vision than most of us, Dr. Edward Everett Hale used to say that the entire Appalachian Mountain System, from Maine to Georgia, must be taken by the Government. Timber grows very slowly. Most trees require from eighty to one hundred years to reach maturity. This crop cannot be handled advantageously by private owners. Even rich corporations cannot afford to wait so long for returns, and should not be asked to do so. The best of them leave the high slopes skinned of timber, covered with debris, and in a condition to invite fire from a camper's match. The inflammable nature of mountain soils and the tremendous power of erosion incessantly at work in all mountain regions, cannot be met and overcome by private interests. The public interest and private interest in the control of these lands are in sharp contrast. In a country of 100,000,000 people with the lack of control that has characterized our American use of natural resources, a continuous appropriation of $2,000,000 a year, until the renewed forests become sufficiently productive, will prove none too much. It will steady the country, not only against extraordinary fluctuations in prices, but also against monopolistic control that is always likely to take advantage either of fluctuation or scarcity.



PURCHASE AREA AND WATERSHEDS

MAP OF NORTHERN NEW ENGLAND SHOWING THE RISE OF THE IMPORTANT RIVERS IN NEW ENGLAND IN THE WHITE MOUNTAIN REGION. IT SHOWS THE PRESENT PURCHASE AREA THAT SHOULD BE EXTENDED TO INCLUDE AT LEAST THE HEAD WATERS OF THE CONNECTICUT

A great and creditable work has been accomplished with the money available under the Weeks Act, in the purchase of Federal Forest Reserves in New England and the Southern Appalachians during the last four years.

One and one-quarter million acres in the least accessible parts of these regions have been examined and purchased. Anyone who has had experience in buying land, particularly tracts of forest land, will realize the force and tact necessary to make such extensive purchases successfully without encountering severe criticism. The great task has been honestly and skillfully done.

In the White Mountains 265,000 acres have been acquired; in the Southern Appalachian Mountains a little more than 1,000,000 acres. To friends of the White Mountains this is disappointing and appears a disproportionate division, especially to those who realize the close relationship between

Photo by E. D. Fletcher, United States Forest Service

SOUTH SLOPES OF THE PRESIDENTIAL RANGE

THESE SLOPES ARE PART OF THE UNITED STATES FEDERAL FOREST RESERVES IN THE WHITE MOUNTAINS ACQUIRED BY THE PURCHASE IN SEPTEMBER, 1914, AND ARE TYPICAL OF MUCH OF THE LAND WHICH IT IS HOPED MAY BE ADDED TO THESE RESERVES DURING THE NEXT FIVE YEARS

the mountain forests and the extensive water-powers upon which New England's industry largely depends. To be sure, the Act as passed was not intended to protect industry, but only, under the Constitution, to protect navigation. While all of New England's rivers are navigable for short distances, and the Connecticut River for a distance of 50 miles, with a fleet of thirty-five vessels between Hartford and New York, we have not the navigation interests that are found in other parts of the country. The bill provides, however, for the purchase of forest lands at the head waters not only of navigable streams, but also of streams that may become navigable. In view of the efforts on the part of important commercial organizations in Massachusetts and Connecticut to extend navigation on the Connecticut River from Hartford to Springfield and Holyoke, and of the efforts by State Commissions, both in Massachusetts and New Hampshire to extend navigation on the Merrimac River to Lawrence and Lowell, and even to Manchester, the purely navigation interests on New England Rivers assume an importance that cannot be overlooked, and that warrant an ample and more generous policy of forest protection. This is a piece of work that New England cannot legally accomplish for itself. This is a task that only the Federal Government can accomplish. The disproportion mentioned above is still further apparent in the purchase areas that have been designated. An area at the North has been set apart to include, unwisely we believe, only a little more than 600,000 acres, as against 5,000,000 acres that have been set aside for purchase at the South.

In the White Mountains a large proportion of the land that has been purchased is cut-over land. Many persons believe that to have acquired a larger proportion of the standing timber that still remains in broken patches upon the high slopes of the White Mountains, would have more fully carried out the purpose and intention of the Weeks Act. These forests at high elevations are composed almost exclusively of spruce and fir, because these shallow-rooted species can spread out in thin soils, and find subsistence where other trees fail. The mountain soils, composed largely of vegetable mould, and their products, the forest, are both inflammable. Forest fires seriously cripple these soils and not infrequently reduce considerable areas to bare rock, from which flood waters only can descend. The ordinary method of lumbering on these high slopes is that of clean cutting, for the reason that whatever the lumbermen leave the wind destroys. It is a dead loss to the operator to leave anything. Following this method fire and erosion do their worst, and if they do not render the soil permanently barren, a condition far more frequent than the casual observer would believe, they so cripple it that two or three centuries are necessary, in our cold northern mountains, to reproduce a commercial forest. It was to prevent this Chinese treatment of our American mountains that the Weeks Act was passed.

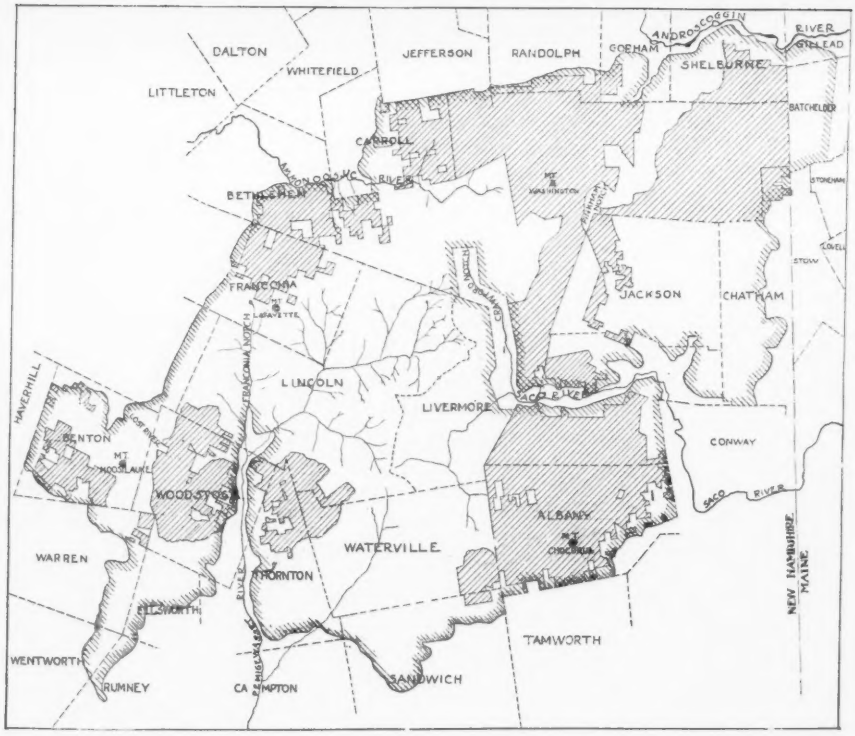
The method of logging pursued by the Federal Government on the National Forests provides for removing the mature trees, clearing up the debris, protection from fire, and preservation of the crown-cover of the forest so that the sun does not beat upon and dry out the soil, protection of the forest trees from wind, insects, and fungous diseases, regard for water flow, for reforestation, and last but not least, for the beauty of trails and roadsides in much traveled places.

All who know and love the White Mountains, in whatever part of the country, will be glad to learn what land has been acquired. The ten year's struggle to secure the Act at the hands of Congress has resulted in keen interest in each individual purchase. Of the 265,000 acres acquired, the first purchase that was made included the spruce forests on the north slopes of the Presidential Range. By good fortune, but not by design, these woods were the favorite haunts of the Appalachian Mountain Club, and contained their most numerous trails. Unfortunately this tract was not acquired until after heavy operations by the old lumbering methods had robbed many of its ridges

Photo by B. R. Jones of the B. & M. R. R.

MOUNT ADAMS AND MOUNT MADISON IN NEW ENGLAND

THESE TWO MOUNTAINS HAVE RECENTLY BEEN ACQUIRED AS PART OF THE WHITE MOUNTAIN NATIONAL FOREST. THERE IS CONSIDERABLE PRIMEVAL TIMBER ON THE MOUNTAIN SLOPES. IT IS EXPECTED THAT MANY PEOPLE WILL TAKE ADVANTAGE OF THE OPPORTUNITY OFFERED BY THE GOVERNMENT FOR ESTABLISHING SUMMER HOMES AND RECREATIONAL RESORTS IN THESE WHITE MOUNTAIN RESERVES



National Forest in the White Mountains

MAP OF THE PRESENT PURCHASE AREA IN NEW HAMPSHIRE AND MAINE, SHOWING IN HATCHED LINES THE TRACTS ALREADY PURCHASED, OR APPROVED FOR PURCHASE

and valleys of primeval forest. Much valuable timber, however, remains. On these moist north slopes fire has not followed, making of these woods an unusual exception. In many places young spruce trees are seeding in abundantly. The fire danger has not passed, however, and everyone who traverses the paths should be cautious.

The southern slopes of the Presidential Range have been acquired also. These include two adjoining valleys striking in their differences of condition. One of them, the Rocky Branch, was heavily cut and burned over before its acquisition by the Government. The angel of death appears to have found no passover sign, and to have ravaged this valley with complete desolation. Seed trees and seedlings are gone. Where the soil is not burned away, small bird cherry trees, the seeds long dormant, cracked by fire, are springing in by the million. These have no value and will occupy the soil from fifty to eighty years. It takes half a century after a fierce fire for little spruces to seed in again, and another half century at this elevation for them to become 6 inches in diameter. The summers, under the summit of Mt. Washington, are short and cold. It requires another half century for the trees to become small saw logs. From the human point of view, a two century set-back is not a light matter.

The adjoining valley is the Great Gulf that projects its wide space into the east side of Mt. Washington. Here the primeval spruce timber is standing. It ranges in small sizes to be sure. How could a wind-swept valley at high elevation produce other than small timber? Yet, taking the valley as a

Photo by Guy L. Shorey, Gorham, N. H.

SLOPES OF MOUNT WASHINGTON

THIS WELLKNOWN MOUNTAIN IS NOW A PART OF THE WHITE MOUNTAIN NATIONAL FOREST. THE VALLEY CONTAINS A GREAT AMOUNT OF TIMBER THAT CAN BE HANDLED BY THE GOVERNMENT AT A PROFIT AND THERE IS NOT MUCH DANGER OF FIRE

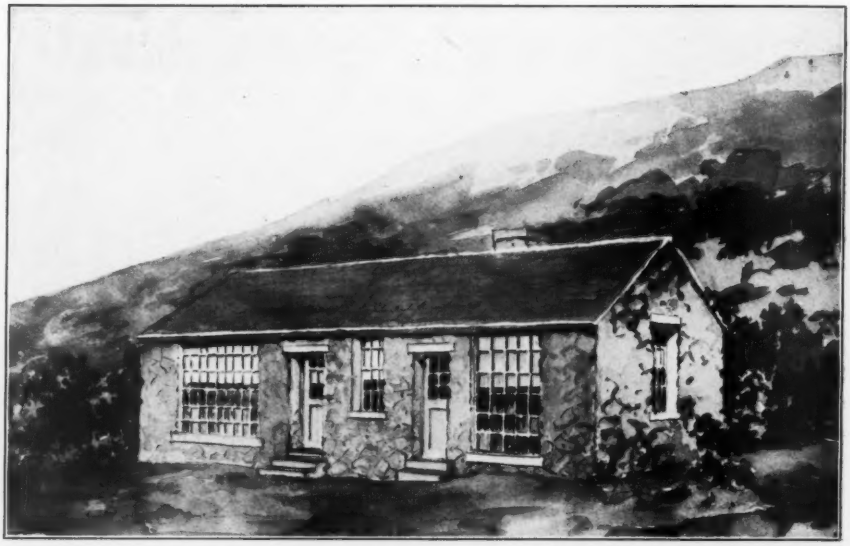
whole there are very large values. If later the larger trees are removed, when the advance in prices shall enable the Government to take them out at a profit, a second cutting and perhaps a third can be taken out from this uncrippled soil, before the burned over area in the neighboring valley will be fit for use. What is more wickedly unmindful of the future than reckless

destruction of soil capacity? What can be more favorable to those floods that the Weeks Act seeks to prevent? Nothing is more important in the White Mountains than for the Government to acquire the remaining timber, before it is forever too late.

Probably some will raise the question, often asked when the Weeks Act was first up for consideration, "Why does not New Hampshire save the White Mountains?" The answer is simple and plain. But one of the very many large manufacturing enterprises, and none of the navigation interests, that are affected by the protection of the forests in the White Mountains, are located within the borders of New Hampshire; they are all in other States. New Hampshire has a total population of less than 450,000 persons. These are farming people and small manufacturers, almost wholly without men or families of large means. It is clearly not the duty of these few people to bear the burden of a National Forest. New Hampshire has purchased the Crawford Notch at the cost of $100,000.

Since the Weeks Act was passed logging operations have unfortunately been permitted in a steep valley that forms a part of Franconia Notch. In this valley a destructive fire swept over one of the ridges before any logging operations were undertaken there, making the ridge permanently barren. We have now the debris where seven million feet of spruce timber have been recently logged off clean. The present prospects of this steep valley are not promising. New growth on this thin soil will be very slow, even if a fire does not set it back for several hundred years.

A purchase comprising 35,000 acres has been made on the eastern side of the Carter-Moriah Range in the valley of the Wild River, a beautiful country not much known hitherto because of its comparative inaccessibility. The new roads and trails constructed by the Government for fire protective purposes, are also opening up this region for visitors of the hardy type. Though severely burned in places, the tract contains much valuable timber that will be taken off later by the Government and thus render a partial return at least upon the original outlay.



THE NEW STONE HUT OF THE APPALACHIAN MOUNTAIN CLUB AT THE LAKE OF THE CLOUDS, NEAR THE SUMMIT OF MOUNT WASHINGTON

BURNED OVER LAND ON THE WHITE MOUNTAINS

THIS MOUNTAIN HAS BEEN REPEATEDLY BURNED OVER BY FOREST FIRES. WHEN THE ROOTS OF THE TREES, WHICH HELD THE GROUND IN PLACE WERE FINALLY CONSUMED A LANDSLIDE OCCURRED AND A FREIGHT TRAIN WAS WRECKED AT THE FOOT OF THE MOUNTAIN

Large portions of the Pinkham Notch have come into possession of the Government, excepting the steep slopes of the Carter-Moriah Range on the east side of the valley. In this beautiful Notch the Glen Ellis Falls are located, and farther north one gets the wonderful view of Mt. Washington.

Both the north and south slopes of the Tamworth Range have been taken, including the whole of Mt. Chocorua. A portion of this purchase is on terms that permit the timber to be removed later by the lumber company, but this must be done, under rules by the department of agriculture. Before this tract

was recently acquired parts of it had been logged over. It was therefore covered with debris. A destructive fire broke out on the twelfth of May, 1915, and again after two rain storms on the twenty-seventh of May, and in spite of all efforts is still burning on the fourteenth of June. This shows how difficult it is to put out a mountain fire on cutover land, and how needful to acquire it before it is cut. Unless the remaining timber on the high slopes is acquired before it is cut over, there will be grave danger of other such fires after the Government has acquired the land. Lumber operations are active in parts of the White Mountains.

Considerable tracts of land have been acquired in Bethlehem and Franconia, including the northern slopes of Mt. Lafayette and Mt. Garfield. A new trail constructed by the Government for making this forest accessible in case of fire, opens up also to visitors for the first time the summit of Mt. Garfield and the beautiful falls on the north side of the mountain.

Two tracts have been taken in the Pemegewasset Valley in the towns of Woodstock and Thornton; one of these tracts covers the eastern foothills of Mt. Moosilauke and extends up to the height of land that forms the Connecticut and Merrimac watersheds. Here is the Lost River, a series of glacial caverns and giant potholes made by the receding ice-sheet many thousands of years ago. This small tract has been purchased by the Society for Protection of New Hampshire Forests.

Not the least of the Government purchases lies on the southern slopes of Mt. Moosilauke; a tract of about 7,000 acres. This purchase includes the most timber per acre and the highest value per acre on the average, of any land thus far acquired in the White Mountains. Here much mature spruce timber is standing. Here the Government has located the first of its felling operations. Over a considerable area that has been partially cut over in years past, and where the young growth is springing up in excellent condition, a body of mature trees is obstructing the development of young trees. No better place could be selected for beginning the work of logging under the Government method. The mature timber needs to be saved. Young growth needs more light and relief from competition; the brush will be disposed of so that no danger of fire will remain. The form of contract requires that a strip of timber shall be left on either side of the highway.

And now the question arises, shall the Weeks Act be renewed? The experiment has been successful, and shall the country embark upon this permanent policy? New England answers, Yes, and will work for the measure; but New England wants a larger and more sympathetic view of her needs in the administration of the new Act. A glance at the map of northern New England will show that in laying out the present limit in which purchases are made, no attempt is shown to cover the head waters of the Androscoggin River, the Kennebec River or the Connecticut River. The Androscoggin and the Kennebec have extensive natural lake storage, and, too, perhaps the protection of their flow is less a matter of immediate necessity. The Connecticut River, however, has no natural lake storage. Its flow is directly dependent upon the forest cover. This river affects directly the well-being of a very large population estimated at more than 2,000,000 people, located in four States. It bears an extensive commerce, and a strong movement is on foot to extend navigation upon it for many miles. Surely this river, if any in the country, deserves adequate attention at the hands of federal authorities, to whom the administration of the Weeks Act is entrusted. There is a considerable body of wild mountainous land in northern New Hampshire that should be included in the Government purchase in order to protect this river. The original source of the Connecticut is in New Hampshire. There is a large body of land in Vermont that is equally important to its even flow. Vermont has not yet passed the enabling act, but is considering it, and will probably do so at the next session of its legislature. We ask particularly for a larger consideration of the needs of the Connecticut River.

To my mind the American Forestry Association exists for the purpose of getting things done which ought to be done. Achievement in American forestry depends directly on the twin forces of progressive legislation and efficient public administration. To secure the latter we must have technical foresters in charge of the executive machinery, and a complete freedom from political or partisan control of the National and State Forest Service. Only in this way can we hope to secure impartial administration of forest laws. The present and growing tendency on the part of politicians to endeavor to secure control of the appointments and appropriations of State forestry organizations by means of consolidation with fish and game administration and other devices must be resisted by a campaign of education. Similar attacks on the policy of National forestry through the arguments for States rights, must be fought with equal vigor.

The ideals aimed at and secured by foresters in public service constitute a new standard for our American civilization, of unselfish devotion to common good, the harmonizing of conflicting interests for the best prosperity of all, and the guarding of our future welfare without neglecting the still more important needs of the present.

The American Forestry Association represents the popular demand which created this public service and it is through our association that the public can best secure its continuance and protection from political attack.

Whatever else we may do, is secondary in importance to the maintenance of a high standard of efficiency in State and National Forest Service. If efforts to degrade and debase public forest administration to the level of party politics are successful, American forestry will utterly fail to establish itself and the preliminary achievements which so far have merely laid the foundations, will be of no avail.

HERMAN H. CHAPMAN.

Director American Forestry Association.

JAPANESE FORESTRY STUDENTS

THESE YOUNG MEN ARE IN CHARGE OF PROFESSOR KITAO MOROTO OF THE FORESTRY SCHOOL OF THE TOKYO IMPERIAL UNIVERSITY OF JAPAN

JAPANESE FOREST SCHOOL

EXCELLENT work is being done in training foresters at the Forestry School of the Tokyo Imperial University in Japan, which is in charge of Professor Dr. Kitao Moroto.

"The forests attached to the college are eight in number," says Dr. Moroto in a letter to AMERICAN FORESTRY, "two in Tokio-Fu, one in Chiba Prefecture, one in Hokkavido, one in Formosa, two in Corea, and one in Sachalen. The sum of the area of these forests is about three hundred thousand acres (300,000). The college forest in Chiba Prefecture covers an area of about 5,358 acres and is divided into the Kiosumi and the Okuzan forests by the boundary line of the Provinces of Awa and Kazusa. This forest is intended for use in practical instruction in forestry and for the investigations undertaken by the professors and students in the Forestry Department of the College. It is hoped that it may also serve as a model of scientific forest management in this country.

The Kiyosumi forest attached to the college occupies the southern slopes of Mount Myoken in Awa, where stands the famous temple of Serchoji. The forest, comprising an area of over 831 acres, is situated about 3 miles north of Amatsu-cho, on the southern coast of the Province, its highest point having an elevation of about 1,000 feet above the sea level. The Forest zone belongs to that of broad leaved evergreen trees, and the most important forest trees here to be found are *sugi* (cryptomeria) japonica Bon and Momi (aboris firma). The former are the result of planting and extend over about 490 acres. The latter being natural occurs as a pure wood, or as the over-wood of coppice woods with standards. Most of the remaining portion of the forests consists of coppice woods which are composed

of over seventy species of forest trees, both evergreen and deciduous. Since this forest has come under the control of the college, a systematic method of management has been introduced to provide a model forest for practical work, and at the same time to serve the purposes of investigation and instruction, as well as to make the public acquainted with the systematic management of forests. With these objects in view, roads have been projected through the districts and the necessary surveys have been carried out. The whole district has been so laid out as to make possible systematic working; and the annual cutting and other forestry operations will be regulated according to a working plan.

Also a lot of woodland in the forest with an area of about 60 acres, where no cutting has ever been done, is protected against the ax in order to preserve a fine specimen of primeval forest and to afford some illustrative aids to silvicultural study."

THE BLACK HAWK TREE

By Jens Jensen.

AMONG a great many trees of historic value in Illinois the old Black Hawk Tree was the foremost of all. This giant cotton-wood that stood like a sentinel over the prairies just a little west of the village of Wilmette, one of Chicago's suburbs, reached the good old age of over 600 years. It was destroyed by a malicious act, and at the time of its death did not show a single dry limb or any deterioration in its noble form. This giant towered over the prairies 130 feet and its diameter measured a little over 12 feet near the ground. It was hollow at the base with an opening of 5 feet by 9 feet. The hollow was large enough to hold a man on horseback, and an early owner of the tree used it for a pigpen.

During the great fire of 1832 this was the only tree left unharmed in this region. The Indians supposed it to be under the protection of a great spirit, and it became a gathering place for the Medicine men from the various tribes that roamed about this section. Pieces of the bark were used as love charms by the Indian maidens.

During the Black Hawk war the Sax drew upon themselves the wrath of the Foxes and the Pattowatamies by selling their land to the Government. About this time a young Sax warrior fell in love with a beautiful daughter of the Pattowatamies, but fearing the wrath of their people they met at the tree, believing the sacred ground around it would protect them from molestations. This romance was suddenly interrupted by a party of Sax, killing the young warrior and burying him beside the tree. The Indian girl made her escape but soon after returned to the tree and killed herself upon her lovers grave. It is said that her spirit still haunts the place.

Black Hawk himself often assembled the chiefs of his confederates around the tree, and many of the campaigns against the white were planned beneath its shadow. The early pioneer recognized it as a land mark, and this it was until its death a few years ago. Strong and sturdy as it was it might have lived for additional centuries, passing its early associations from generation to generation. There are other trees of equal importance over the country that should be protected from harm and vandalism. Proper foresight would have preserved this old tree for coming generations.

There are or have been numerous trees of great historical interest in the United States and Canada. American Forestry invites from its readers brief descriptions of any such trees of which they know.—Editor's Note.]

ESTABROOK PARK

AN experiment in private forestry which should encourage others who have similar opportunities is told for AMERICAN FORESTRY by Mr. J. A. Estabrooks of Boston. He writes:

"On retiring from business in 1889 at the age of 36, I went for a holiday to Tryon, N. C., among the Blue Ridge Mountains, 40 miles south of Asheville and 2 miles from the South Carolina border. Things in 1889 were very primitive at Tryon. Continuing to visit that region, in the winter of 1894 I bought 36 acres of forest land at a low price. It was the usual unsightly collection of uncared for trees.

"I applied the treatment of improvement cutting and bonfires of the debris for several winters, until at last even a native mountaineer called my place 'the best stand of trees in Polk County.' In 1894 hardly anyone knew what forestry meant. The usual opposition argument was 'Why! it takes 100 years to grow a tree.'

"In 1914 I sold the 36 acres at an excellent profit, partly owing to the popularity of Tryon as a resort, and obtained the guarantee of a continuous stand of trees under forestry treatment. A condition was kindly attached by the purchaser, Mr. J. L. Washburn of Duluth, Minnesota, that the woods should be named as a park after me. There is a great variety of trees on the Park, the Tulip tree being especially in evidence."

The accompanying pictures show views of Mr. Estabrooks land taken some years ago. The condition of the trees on it has been greatly improved since then and now the stand is a most attractive one.

ESTABROOKS PARK FROM TRYON, N. C.
A VIEW OF THE PARK IN THE LEFT MIDDLE GROUND FROM ONE EDGE OF THE TOWN. THE APPROACH OF THE TOWN TO IT ADDED SOMEWHAT TO THE INCREASE IN ITS VALUE

ESTABROOKS PARK, NEAR TRYON, N. C.
THIS TRACT OF LAND, BOUGHT BY J. A. ESTABROOKS OF BOSTON IN 1894, AND SUBJECTED TO IMPROVEMENT CUTTING ON FORESTRY PRINCIPLES WAS SOLD TWENTY YEARS LATER AT A HANDSOME PROFIT. MR. ESTABROOKS' EXPERIENCE SHOULD BE AN INSPIRATION TO OTHERS

Tyron County, where this park is located, has a most effective forest fire protective association, organized about a year ago, and described in a recent issue of AMERICAN FORESTRY. There is much cut over land on which second growth is well established and which, with efficient fire protection, will some day be of considerable value.

OLD AX MARKS IN TREES

By AVERN PARDOE

MR. STRAIN'S letter in AMERICAN FORESTRY for May, p. 659, reminds me of a discovery I made a few years ago. I was cutting a large white pine, about 3 feet in diameter and 150 feet high, when about a third of the way through the ax went into what I thought was rot. The remainder of the cut was made with the saw. We then found the supposed unsoundness was in reality a cup cut into the tree when it was young and subsequently overgrown with new wood. There were over eighty rings of new wood outside the cup and about seventy rings had been formed before the cup was made. It was undoubtedly Indian work as eighty years ago there were no white people in the district. The purpose of the cut must have been to gather gum for the making and mending of canoes, etc. The place was the shore of an island in Lake Joseph in the Mishoka District, Ontario, Canada.

A WORK ON THE CONSERVATION OF WATER BY STORAGE

By GEORGE FILLMORE SWAIN, LL. D.

Reviewed by HENRY STURGIS DRINKER,
President of Lehigh University and President of the American Forestry Association.

THE CONSERVATION OF WATER BY STORAGE, by George Fillmore Swain, LL. D., Gordon McKay Professor of Civil Engineering in Harvard University; Past President American Society of Civil Engineers; Yale University Press, New Haven, Connecticut, 384pp. price, $3.00

THIS very valuable work is made up of a collection of studies fitting one into another, so as to present a harmonious whole, being addresses delivered in the Chester S. Lyman Lecture Series, in 1914, before the Senior Class of the Sheffield Scientific School of Yale University.

It is the most masterly, comprehensive and authoritative deliverance on the general subject of the Conservation of Water by Storage that has ever appeared, and the chapters particularly devoted to the water power question, in which the author is a recognized leading expert, are most timely in view of the large amount of irrelevant talk and political bias that has characterized much of the public discussion of this important economic question, not only in the National Congress but also in the National Conservation Congress.

Dr. Swain's opening chapter on "Conservation in General" is an illuminating summary highly instructive and suggestive to those who have already studied the subject and of the greatest value to the man or woman who is seeking light on this great national question.

This general discussion is followed in Chapter II with a discussion of the Conservation of Water and its relation to the Conservation of other Resources. What could be better or more succinct than the following:

"It is clear that there are three kinds of natural resources, in the Conservation of which we are concerned—1. Those resources which are not renewable, and in which utilization, even though without waste, necessarily destroys the store available for future generations. Such are coal, oil, gas, phosphates, and other mineral deposits. Every particle of these resources which is utilized diminishes by so much what is left for our successors.

2. "Those resources which are self-renewing, though at a comparatively slow rate, requiring considerable time for a complete renewal. In this class are included the forests, which may be entirely cut down, but which will ordinarily reproduce themselves in time. In case of these resources, as in the case of those in the first class, any utilization diminishes the store available for our immediate successors, although distant future generations may be able to replace the loss of those resources which fall in the second class.

3. "Water power falls in a different class from either of the above, and seems to occupy a place by itself, having several peculiar characteristics. In the first place, while resources of the first two kinds, if not utilized, are in general stored and *preserved* for the use of future generations, water power, if not utilized, is *constantly wasting with no good results to anybody*. Nevertheless the water flows day by day and year by year, and, speaking generally, the power is perpetual. It is like a free gift offered by the Creator to man, which flows by him in a continuous stream and may be had for the asking. Water power, however, presents a second peculiar characteristic in that its conservation is a double conservation. The utilization of water power for a purpose for which steam power, or some other form requiring the use of

fuel, would be employed, is not only the utilization of a freely given resource which would otherwise be wasted, but it involves the saving of a corresponding amount of one of the non-renewable or slowly renewable resources. The use of water power to furnish motive power for street or steam railways, or for lighting, saves an equivalent amount of coal. The conservation of water power, therefore, is a double conservation, and it would seem, therefore, inasmuch as it involves the conservation of a non-renewable resource of a strictly limited supply, that its conservation is of greater importance than that of any other of our material resources."

This is followed by a masterly discussion and exposition, from an engineering standpoint, of water power utilization, with a study of Riparian Rights and of the powers of the Government over Navigable Streams, and in Chapters III and IV by a study of questions surrounding the problems of Water Power at Government Dams, and of Water Power at Private Dams. The engineering, riparian and other legal questions involved are exhaustively discussed, yet succinctly and without prolixity or unnecessary expansion.

The author luminously weighs the important questions surrounding governmental control and well says: "Indeed the conservation movement in the past, particularly as regards water powers, has been too much dominated by the idea of enforcing the arbitrary powers of the Federal and State Governments, and extending regulation and restriction to their utmost limits." And Dr. Swain here quotes the remark of a well-known Senator who said, "That is the trouble with the present craze for restriction and regulation of private investment in these enterprises. You regulate and restrict to the extent that you have nothing to regulate."

Dr. Swain further wisely says, "It is from a point of view of pure conservation that the development of water power is most important. When we consider also that the development of water power not only conserves fuel, but directly serves to promote the navigability of rivers, we should be very careful how we discourage this triple conservation in order to secure other results which we may consider desirable. If we do discourage it, we may be antimonopolists, or something else, but we are certainly not conservationists. The conservation movement, originating in a wise demand for the economical use of our natural (not national) resources, has too much deteriorated into a demand that those resources be retained by the National Government and not permitted to be developed by private capital except under restrictive burdens."

What a broad statesmanlike and wise conclusion is given in the following summary of Dr. Swain's admirable discussion in Chapter IV of the questions surrounding the matter of monopoly in Water Power Development:

"Finally, in considering this entire water power discussion, it is very important to avoid the attitude of mind taken by so many in these days, which assumes that average business morality is less than average public morality. In times of old, it was a popular adage that 'the king can do no wrong,' though perhaps, rather than popular, it was a belief entertained mainly by kings themselves. Today there is a similar popular impression that the Government can do no wrong. Where the people are sovereign, they are very apt to imitate other sovereigns in assuming themselves incapable of error. It was a maxim of Robespierre's, which dictated his entire infamous career, and which led to his brief period of power and his ultimate ruin, that 'The people are never wrong.'

"Both impressions are equally erroneous. Government bureaus and officials in a democracy may be guilty of just as flagrant abuses of justice as kings or individuals."

Chapter V on "Water Power on the Public Domain" is a timely discussion of a great question which occupied much attention in the last National Congress, and which presents facts and engineering conclusions which should be of weight in the final determination of the Government policy. To show the serious economic question presented by the Government's continued ownership of lands, in Western States, Dr.

Swain quotes from the testimony given in the recent 63rd Congress the following table showing approximately the "Percentage of the Area of far Western States owned by the Federal Government:"

State.	Total Acreage owned by United States.	Percentage of Total.
Arizona	67,097,293	92.00
California	53,276,547	52.58
Colorado	37,702,033	56.67
Idaho	45,218,919	83.80
Montana	61,049,263	65.80
Nevada	62,219,423	87.82
New Mexico	49,315,409	62.83
Oregon	32,229,745	51.90
Utah	43,564,645	80.18
Washington	17,684,198	40.00
Wyoming	42,613,499	68.00

This large retention by the Government of lands originally embraced in the public domain and contained in the boundaries of the several states when given statehood rights involves complicated questions of control and ownership by the Government in such lands, and of exemption from State taxation, wholly different from any presented in the Eastern and Middle States. Dr. Swain shows that "one of the most serious obstacles to the development of water powers on the public lands is that the Government permit which must be obtained is now, by law, revocable at any time at the will of the Department by which it is granted, and is also subject to such conditions as that Department may impose not only when the permit is granted, but subsequent thereto."

This evil was sought to be corrected by legislation considered, but not passed in the last Congress, and which will doubtless be revived in the next Congress, when Dr. Swain's masterly technical discussion of the whole question from a purely impartial technical engineering standpoint will be of great practical value in reaching a sane business conclusion. In concluding his discussion of this matter Dr. Swain says, "The onerous restrictions which have been criticised in this chapter will not, of course, entirely prevent water-power development, although, in the opinion of the writer and of many other engineers, they are quite sufficient to do so if they were thoroughly understood by investors. Undoubtedly, however, they do hinder development, increase the cost of financing and render necessary a higher rate of interest than would otherwise be requisite. They therefore discourage true conservation in the sense of use."

Chapter VI discusses "Technical Aspects of Conservation by Storage" beginning with the five related problems of (1) the use of water as a source of power; (2) the use of water as a source of water supply for communities; (3) the use of water for irrigation; (4) the promotion of river navigation; and (5) the prevention of damage due to floods, and this chapter gives a masterly exposition of the steps to be taken to make the flow of a stream more regular by preventing the run off from being discharged immediately or rapidly into the streams and by promoting a gradual discharge

1. By the construction of surface reservoirs.

2. By so treating the surface of the ground that rapid discharge will be prevented, by preserving and increasing the forested areas, especially on steep slopes, or by breaking up the ground on flat areas, for cultivation.

The construction of storage reservoirs is thoroughly gone into, with many examples and illustrations of existing dams both completed and while in course of construction. In summarizing the relative advantages and disadvantages of steam and water power plants the author again emphasizes from the wealth of his experience, the need of fair liberal treatment, if water power plants are to be made financially successful saying, "Once safely financed and in operation, with a good market and fair treatment, water power developments are very attractive on account of the greater convenience, the small operating expense, the small amount of labor employed, the consequent absence of labor troubles, independence of fuel supply, smaller depreciation, and the comparatively small amount of working capital needed. These advantages, however, may be more than off-set if the permit is not

definite, or if it is revocable, or if burdensome regulations and restrictions are likely to be imposed. If water power is to be developed, inducements must be offered to investors, including a reasonable assurance of fair treatment from the public authorities."

Chapter VII on "Forests and Stream Flow" is intensely interesting to both the engineer and the forester, with its discussion of sub-surface storage, and the application of inductive and deductive reasoning in studying the relation between forests and the flow of streams.

Chapter VIII is devoted to "Floods." The author expresses the opinion that "There seems little doubt that, speaking generally, river floods, and the damage which they cause, are increasing in the United States." He groups the causes of river floods under the following heads:

1. "The fact that the rain-fall is unequally distributed, and that large quantities fall during storms in a comparatively short period of time.

2. "The fact that the rain falling upon the ground is not held back, but flows rapidly from the surface into the streams, or that the melting snows are carried off in the same manner, and discharged into the streams in a comparatively short time.

3. "The fact that the stream channels are not large enough or smooth enough, or do not have slope enough; in other words, that the stream channels have not the capacity to carry off the maximum amount of water delivered to them without rising above their banks."

Following this Dr. Swain discusses the remedies available or proposed to prevent floods, by building surface reservoirs, by forestation and cultivation (as noted also in Chapter VII), by increasing the capacity of river channels and by constructing cut-off channels.

In the various numbers of the Appendix Dr. Swain has presented copies of a number of official documents and Acts of Congress of interest in connection with the general subjects treated in his work.

Dr. Swain's work will be of value and interest to engineers and foresters and to all students of conservation for it is the product of a master mind, versed in the great subjects treated and endowed with the faculty of presenting them to experts and to the inexpert with impressive yet pleasing and convincing insistence.

EDITORIAL

NEW YORK'S FOREST PROBLEM

IN AN effort to modify the present rigid requirements of New York's Constitution, which now prohibits all cutting of timber in the State reserves, the Constitutional Convention is considering the adoption of an amendment which would allow the sale and removal of dead or down timber, while retaining the clause which prevents the cutting down of green or live trees.

In the decade of 1890-1900 a law exactly similar to the proposed statute was passed by Congress to permit the logging of dead and down timber on Indian reservations in Minnesota, in which the green timber could not be sold at that time, pending the completion of estimates and other formalities. This law became the cloak for extensive operations, under which green timber was cut right and left. Suits brought by the Government to recover the value of the timber and prevent further trespass resulted in a remarkable decision by a Federal judge, to the effect that a "dead" tree was a tree which had "ceased to increase in value." This loophole made it impossible to distinguish "dead" from "live" trees. The entire administration of the law was accompanied by so much scandal that it was repealed in 1902.

An honest and able administration of such a law in New York at present, if it escapes such legal garbling, would successfully prevent the cutting of classes of timber not intended by the Constitution.

But the greatest difficulty remains. Fire killed timber, if it stands in large enough areas, can be profitably logged. Large conflagrations create such conditions. Every few years there will occur periods of drought which will create a fire hazard in the Adirondacks that will tax the utmost resources of the best production system to cope with. There are many irresponsible persons in such regions who would probably be tempted to set fire to the woods at such times, since the result would be to stimulate industry and provide them with openings for employment during the following winter. Deliberate incendiarism occurring in thinly populated regions is a difficult problem to cope with. The incendiary is usually able to escape detection. Here again, a vigilant and thorough protection force might prevent such results.

But in adopting this provision the State of New York would be deliberately creating an extra moral fire hazard which more than offsets the possible advantage of salvaging dead timber. If the Constitutional Convention believes that it cannot trust the State forest administration to properly control the cutting of green timber to prevent damage to the forest, it would be unwise to burden the same administration with the heavy responsibility of a "dead and down" timber clause. The Convention should either permit regulated cutting of both live and dead timber or prevent it altogether.

The prejudice against permitting cutting of green timber is deeply ingrained in the minds of New York citizens, due to distrust of her politicians. The situation demands the complete elimination of politics from the management of the State forest lands. Should the convention be able to accomplish this, they need no longer hesitate to permit cutting. On the Minnesota National Forest, the timber around the shores of the lakes and other points accessible to the public is preserved and protected although the Forest Service has the technical right to cut and remove it. Areas of especial value can be so classified, and preserved in their primitive condition. The remaining areas, unaccessible to the public, can be logged by methods which preserve the forest cover, secure reproduction and prevent waste from decay. These methods have been fully demonstrated on the National Forests. Must New York, through timidity, close her eyes to progress, and either lock up her forest resources, or imperil them with ill considered half measures? Now is the time for the State to establish a sane and orderly administration which will bring the Adirondack forests to a plane equal to that of the wonderful Black Forest of Germany, which, while serving as the recreation ground for the entire region, supports hundreds of villages and thousands of persons dependent entirely on the forest industries for their existence.

$10,000,000 MORE FOR FOREST RESERVES

ON WEDNESDAY, September 22, members of the American Forestry Association and delegates of various Forestry Societies, Boards of Trade, Chambers of Commerce and other organizations of the New England and Southern Appalachian States will appear before Secretary of Agriculture Houston at Washington in conference. They will ask the Secretary to recommend to Congress the passage of a bill providing for an appropriation of $10,000,000 to be expended at the rate of $2,000,000 a year for five years in the purchase, under the Weeks Act, of more Forest Reserves in New England and in the Southern Appalachians.

FOREST NOTES

On May 27 occurred the wedding of Mr. William Robinson Brown of Berlin, N. H., and Miss Hildreth Burton Smith of Atlanta, Ga., at the residence of Mr. and Mrs. Orton B. Brown at Berlin, N. H. Mr. Brown is a director and member of the Executive Board of the American Forestry Association, a member of the New Hampshire Forestry Commission and of other forestry and forest fire protective organizations. He is part owner and assistant treasurer of the Berlin Mills Pulp and Paper Company. The bride is the granddaughter of Gen. John B. Gordon, the famous Confederate leader and the daughter of Mr. and Mrs. Burton Smith of Atlanta.

The University of Washington *Forest Club Annual* for 1915, being Vol. 3 of the series is now being distributed. It is an admirable publication, well printed, well illustrated and with a considerable variety of well written articles on forestry. The *Annual* is dedicated to Edmond S. Meany, the first man to foster and teach forestry at the University of Washington. The contributors are Fred Madigan, Burt P. Kirkland. Prof. Hugo Winkenwerder, Joseph Morgan, Donald H. Clark, Edward J. Hanzlik, Elias S. Clark, and Dan McNeil. The committee having in charge the production of the *Annual* comprised Harold A. Browning, Arthur Bevan, Willis Corbitt, and Donald Clark.

The Seniors of the Penn State Department of Forestry have just returned from their spring camp in Breathett Co., Ky. The work was largely carried out on the tracts of The Mowbray & Robinson Co., specialists in hardwoods.

The Sophomores of the Department of Forestry at Penn State, previous to the opening of the regular summer camp in the Seven Mountains, MacAlevy's Fort, Penn., are with the Central Pennsylvania Lumber Co., at Laquin, Pa.

The work consists of a general introduction to logging, bark peeling, and milling and about a week's work in mill scale studies.

Interesting side trips have been made to the Barclay Chemical Company plant, The Penn Stave Company's mill and Schroder Wood Company's kindling wood factory. En route to Laquin the Paper Mills of the New York & Pennsylvania Paper Company were visited, also the J. K. Rishel furniture factory and the big C. P. S. Company's mills at Williamsport.

Active steps are now being taken by the Bureaus of Public Works and Forestry in Manila to cooperate in a tree-planting scheme for planting trees along the public roads throughout the Islands. Several conferences have been held between the representatives of the two bureaus concerned and it is hoped that a beginning on the work may be made in the very near future.

The Bureau of Forestry of the Philippine Islands is taking up, as one of the most vigorous lines of work for the present year, the inauguration of an active campaign to more intimately acquaint the great body of people throughout the Islands with the possibilities and methods of forest conservation, the benefits which they will receive from such work and the harm which will inevitably occur if these resources are neglected or destroyed.

A review of the State work undertaken and carried out by the Maryland Board of Forestry for the spring of 1915 shows that the supply of planting stock at the Forest Nursery established one year ago was practically exhausted in sales made to residents of Maryland, and the size of the nursery proper increased 65 per cent through plans made for supplying standard varieties of forest trees at cost a year hence; that a total of 4 miles of State highway in as many different counties was planted up with attractive and appropriate roadside trees furnished free from the Nursery to abutting property owners, and the work of supervision likewise given at no cost to them; while in addition to the foregoing a considerable amount of planting was done under direct supervision of the State Forester and his assistants for afforestation of waste and abandoned farm lands, ornamental and protective planting.

The State Forest Service during the coming season will continue to further the improvement of Maryland's highways through the restrictive and careful cutting and pruning of all publicly owned trees, and will also sum up and complete several phases of its work which have been undertaken in seasons past, paying particular attention to the cooperative handling of privately held timber lands for purposes of demonstrating the possibilities of good forestry.

That jack pine is admirably suited for reforesting many of the dry, sandy regions of the North Central States is the conclusion of a new publication of the Department of Agriculture, Bulletin No. 212, "Observations on the Pathology of the Jack Pine." This tree, it is said, suffers only occasionally from winter injury, stands drought well, and is comparatively free from a number of diseases which are commonly found on other coniferous trees. The pine is, however, sensitive to heat. The most important fungous disease from which the jack pine suffers is done by the Peridermium cerebrum, which in many localities presents a somewhat serious problem. The fungus attacks trees of all ages, frequently killing the young ones and seriously interfering with the development of those which survive. The removal of infected branches from young

growth is recommended as a means of saving many trees from this disease.

The Forest Annual, Vol. 6, of the University of Nebraska has recently been issued and dedicated to Dr. Charles Edwin Bessey, the originator and promoter of the Forestry Department of the University. The new issue maintains the degree of excellence established by previous ones, and has a number of particularly good articles on Forestry, the contributors being Arthur W. Sampson, Arthur T. Upson, George N. Lamb, Clarence F. Korstian, L. H. Douglas, J. S. Boyce, Prof. E. F. Schramm, C. R. Tillotson, Prof. Wm. W. Morris, Albert H. Miller and E. W. Nelson. It is well illustrated and is altogether a valuable and desirable publication.

"Professor Nelson C. Brown of the New York State College of Forestry at Syracuse, N. Y., has started on a three months' trip through the West to gather data on lumbering methods and utilization. In addition to a considerable number of the large western operations, Professor Brown's itinerary includes the various district offices of the Forest Service."

"Students from the Ranger School and from the Summer Camp of the New York State College of Forestry rendered valuable service in fighting the recent fires in the Adirondacks. Nineteen men from the Ranger School and forty men from the Summer Camp were rushed to the front at Star Lake. District Warden O'Brien, Warden Yerder, and Ranger Ferris gave the students high praise, while the cottagers about the lake ascribed the saving of their homes to the work of the young foresters."

A. W. Thompson, who operates a sawmill in Saulsbury's Woods, on the Cherry Hill Farm, Maryland, says it is not necessary to go to California to see big trees. He recently cut an oak tree that sawed 1,964 feet of lumber.

He also cut a gum tree that measured 44 inches across the stump, making four logs 18 feet long, one log 14 feet, one log 7 feet, the smallest log being 14 inches across the small end.

He cut an oak that contained a swarm of bees, an old squirrel in her nest and a snake 4 feet long. The bees, squirrel and snake were not 6 feet apart in the hollow.

The total forest area of the South is estimated at 259,000,000 acres. That of Germany is about 35,000,000. In 1913 the whole United States cut 38,000,000,000 feet of lumber, of which the South cut more than 22,000,000,000, including fifteen billion feet of yellow pine. One Louisiana sawmill cuts 1,000,000 feet of this wood a day. Eight years ago the site selected for this mill was in a stretch of virgin forest. Today it stands upon the outskirts of the thriving and unusually attractive little city of Bogalusa with more than 10,000 inhabitants and stores, residences and public buildings which would be the pride of many an older community of much greater size.

A prize of $25 has been offered by the Manufacturers Association of Seattle to the discoverer of the tallest tree in the world. When found it will be bought and converted into a flagpole in a prominent location in Seattle as a monument to Washington's lumber industry.

Arrangements have been made by the Lighthouse Service with the Forest Service for the reforestation of certain light-house reservations in the eleventh lighthouse district, where conditions are favorable for this purpose. In the spring of 1916 about 20 acres will be planted under the direction of a Forest Service officer, and beginning with 1917 the planting will be carried on at the rate of 100 acres a year, the annual cost being estimated at $1,500.

The object of this plan is to perpetuate the supply of timber on lighthouse reservations for use in making spar buoys and for other purposes.

CANADIAN DEPARTMENT

By ELLWOOD WILSON

The Montreal *Gazette* under date of eighth of June prints the following despatch which shows the necessity of the railways under the control of the Dominion Government handling their fire protection under the same regulations which have been so successful on privately owned railways.

"Cochrane, Ont., June 8. Heavy losses have been sustained along the line of the National Transcontinental Railway during the past week by forest fires. The fires raged for a distance of fully 70 miles along the railway between here and Kapuskasing. At the latter place, where several hundred prisoners of war are detained, fire for a time seriously threatened the camp. The prisoners were orderly and no trouble ensued, they themselves joining in the fire fighting. The Provincial Government farm buildings at Ground Hog River were destroyed. At Jacksonboro, the headquarters of the Ontario Colonization Company, many cottages were burned, but the new large mill escaped." This section is in one of the heaviest timbered sections traversed by the National Transcontinental and such a fire is without excuse and due to the lack of the most elementary precautions.

In direct contrast to the above might be mentioned an incident which occurred recently on the Canadian Pacific Railway in Quebec. A spark from an engine set fire to

grass at the side of the right-of-way and this spread to a small piece of timber and was extinguished by the fire-ranger of the Laurentide Company after burning about 3 acres. The next day the defective engine was taken out of service, a special patrolman put on with a track velocipede to follow all trains, the section foreman was severely reprimanded, the master mechanic was hauled over the coals and within four days the Forest Inspector appeared on the scene and appraised the damage and the matter is now before the Claims Department for immediate settlement. The Canadian Pacific Railway has determined to stop forest fires and rid itself of the pest of fire claims. All strength to its arm.

The Quebec Government is taking another step forward, a notice has been sent to all limit holders in the Province saying that the Government wishes to pass an Order-in-Council making it obligatory on all persons lumbering along the right-of-way of any railroad to clear away and burn all tops and debris within 100 feet of the right-of-way. This measure should have the strongest support of everyone interested in the protection of the forests from fire. It is quite time too that this should go a step farther and all persons, lumbermen, settlers and farmers cutting trees should be compelled to burn their debris and slash. The cost would not be large and being made compulsory for all would only place the increase on the consumer. In the long run, an insurance against fires, by making logging easier and travel in the woods more convenient and by promoting reproduction and preventing diseases such a measure would give added profit instead of added cost.

Experiments conducted by the Laurentide Company with the Jensen tree planter this spring, where twelve of these machines were in use, show that in average country, open fields and poplar and birch following fire and averaging about 20 feet in height, that a man and boy with a machine will plant 1,000 to 1,200 trees per ten-hour day, while a man and two boys, the man making holes with a mattock and the boys planting, will only plant 1,000 trees per ten-hour day. Besides, the trees planted with the machine are more firmly set, and the ground is less disturbed than with the mattock. This is of value where there is a thick layer of duff. The mortality among trees planted with the machine is somewhat less than those planted with the mattock, especially in open fields.

A very interesting bulletin was issued by the Commission of Conservation recently. The National Domain in Canada and its Proper Conservation, by Frank D. Adams, Ph. D., D. Sc. This deals in a general way with Agriculture, Forest Products, Water Powers, Mines and Minerals, Fisheries and the Fur Trade and is well illustrated and contains interesting charts and tables, and maps. This calls attention to the rapidly diminishing timber supply and the necessity of prompt and energetic measures for its protection and conservation.

Chief Forester MacMillan, of British Columbia, who is making a trip to South Africa, Australia, New Zealand, India, China, Japan and South America, in an effort to interest these countries in British Columbia Timber, reached England in the latter part of April and is busy on the transportation problem, since the lack of shipping is proving a serious handicap. While in Europe Mr. MacMillan will investigate the lumber markets in France, Italy and Spain.

In Quebec the dry weather has brought its usual crop of forest fires but they are less serious than usual. Quite a commentary on the necessity of cooperative associations is shown by the fact that the largest fires this spring are on the limits of firms who have refused to become members and who said that their own men could handle the situation. It has now been proved that men who have had experience in fire ranging and fire fighting are the only men competent for such work, and the longer their term of service and the greater their experience the more valuable they become. The idea that any loafer around a town can be picked up in time of emergency and that he will make a competent fire ranger put forward by many self styled practical men has been thoroughly disproved.

The June number of the *Canada Lumberman and Wood-Worker*, is an "Export Number" and contains much material of value to the man or firm looking for export business. Information about foreign measures, monies, export regulations, markets, packing, customs, etc., is given very fully and completely and reflects much credit on the editor.

Messrs. E. G. McDougall, C. S. Cowan and L. R. Andrews have volunteered for the front. They are all members of the British Columbia Forest Service and Messrs. McDougall and Andrews are members of the Canadian Society of Forest Engineers. Mr. Ellwood Wilson has been elected a member of the Society of American Foresters.

Mr. G. C. Piché, Chief Forester of Quebec has planted a number of thousand trees on his estate at Burrill's Siding, thus setting a good example to people in the Province.

Mr. G. A. Gutches, the Head of the New York State Ranger School at Wanakena spent three days at Grand Mere inspecting the nursery work and plantations of the Laurentide Company. Mr. Gutches is a firm believer in the disposal of logging debris by burning and the Laurentide Company will give his ideas a trial in their experimental logging operations.

The British Columbia Government has issued a circular letter to settlers and farmers, embodying the regulations concerning fire permits, giving rules for guidance when burning slash or brush in land clearing operations and information as to what should be done when fire breaks out. It also appeals to all citizens to help eliminate the fire menace and

should certainly be a great help in educating the public along proper lines, and education is the only means which will serve the purpose.

The Technical School started a few years ago by the Shawenegan Water & Power Company in cooperation with other industrial companies in the district held its first commencement exercises on June 10. This school has done excellent work and is destined to be of great service to the region.

The Canadian Pacific Railway is experimenting with a small light motor, costing about $55 which can be attached without difficulty to any track velocipede. If successful this should prove very useful.

BRITISH COLUMBIA NOTES

The fire season in British Columbia opened early under ominous conditions, there being a period of three weeks or more between the last of the snow and the growth of the new vegetation, when the hazard was very great in the northern interior. While a number of serious fires occurred the advent of continuously heavy rains in the first week of May, and the wet weather since, have effectually checked all fires and fostered a healthy growth of vegetation. The conditions recorded above, together with the short winter, did, in one respect, however, materially help to diminish the fire hazard, many thousands of acres of logging and farmers' slash having been dealt with, at the suggestion of or in cooperation with the Forest Branch. In this way many dangerous fire traps were cleaned up, and as a result of the attention paid to disposal of slash by the road and telephone authorities, satisfactory headway has been attained. The number of Forest Guards already appointed and assigned to districts amounts to about 150, in addition to the permanent staff of thirty-eight Rangers. As the season advances it is expected that thirty more Guards and probably fifty or sixty patrolmen will be added.

Mr. H. R. Christie, Assistant Chief of Operation, is making an extended trip of Inspection in the northern Forest Districts conferring with District Foresters Murray, Bonney, Marvin, Allen and Irwin. He reports that while there was a short spring fire season heavy rains have made the north country safe for the present.

During Chief Forester MacMillan's absence on a tour of the world in the interests of trade extension as Special Trade Commissioner, Mr. M. A. Grainger is the Acting Chief Forester of the B. C. Forest Service.

The British Admiralty has been buying large quantities of timber for war purposes of late and the Hastings Mills of British Columbia at Vancouver recently secured an order from them for ten million (10,000,000) feet of Douglas Fir. This will go forward in June and July in tonnage supplied by the British Admiralty.

Mr. Wyngard C. Gladwin, an Inspector of the British Columbia Forest Branch, died after a long illness on April 13.

Mr. Gladwin was a pioneer in fire protection matters in British Columbia, having had charge of the Provincial Fire Wardens from the inception of protection work. Formerly a member of the Northwest Mounted Police, he brought to the work a wide knowledge of men, and the principle of organization and discipline. Mr. Gladwin had succeeded in placing the fire protection work on a sound basis by the time the Forest Branch was established in 1912, and the present system is simply the natural growth of his work. From 1912 until his death he had charge of the railway fire protection work of the whole Province, acting as Inspector both for the Board of Railway Commissioners and the Provincial Forest Branch. Loyal and honorable as an officer, and generous and sympathetic as a friend, Mr. Gladwin's death is deeply felt by his associates.

An interesting departure has been made under the direction of the Hon. W. R. Ross to make our people realize the great importance of the lumber industry and the necessity of protecting the forest resources of British Columbia from damage by fire.

Moving pictures have nowadays an educational power only second to that of the press itself. Hence last year a number of the motion-picture theatres in the Province were supplied with a set of slides to be used in the intervals between the ordinary films. The slides were sent out under instructions from the Minister of Lands with a letter explaining the need for the cooperation of the theatre proprietors in order to reach a large body of the public inaccessible by any other means. The result was entirely satisfactory, both theatres and patrons expressing their appreciation. This year many more were sent out.

CURRENT LITERATURE

MONTHLY LIST FOR JUNE, 1915.

(Books and periodicals indexed in the Library of the United States Forest Service.)

Forestry as a Whole.

Proceedings and reports of associations, forest officers, etc.

Congrès forestier international, Paris, 1913. Congrès forestier international tenu a Paris du 16 au 20 juin 1913. 961 p. Paris, Touring-club de France, 1913.

Hawaii—Board of commissioners of agriculture and forestry. Report for the biennial period ending December 31, 1914. 244 p. pl. Honolulu, 1915.

India—Jammu and Kashmir—Forest dept. Progress report of forest administration for the year 1913-1914. 80 p. Lahore, 1914.

India—Punjab—Forest dept. Progress report of forest administration for the year 1913-1914. 135 p. Lahore, 1914.

India—United Provinces—Forest dept. Annual progress report on forest administration, 1913-14. 154 p. Allahabad, 1914.

Louisiana forestry association. Addresses and proceedings, 5th annual meeting. 59 p. il. Bogalusa, La., 1914.

Michigan—Game, fish and forestry department. Biennial report, 1913-14. 81 p. Lansing, Mich., 1914.

New Brunswick—Crown land dept. Fifty-fourth annual report, for the year ended 31st October, 1914. 81 p. pl. Fredericton, N. B., 1915.

Ontario—Dept. of lands, forests and mines. Report for the year ending 31st October, 1914. 157 p. il. Toronto, 1915.

Pennsylvania—Dept. of forestry. Report for the years 1912-1913. 494 p. pl. Harrisburg, Pa., 1915.

Quebec—Dept. of lands and forests. Report for the 12 months ended 30th June, 1914. 97 p. tables. Quebec, 1914.

Switzerland—Département de l'interieur—Inspection des forêts, chasse et pêche. Rapport sur sa gestion en 1914. 17 p. tables. Bern, 1915.

Switzerland—Dept. des innern—Inspection für forstwesen, jagd und fischerei. Verzeichnis der wissenschaftlich gebildeten forstbeamten der Schweiz, 1915. 21 p. Bern, 1915.

Forest Education

Forest Schools

Michigan, University of—Dept. of literature, science, and the arts. Announcement of the course in forestry, 1914-1915. 33 p. Ann Arbor, 1914.

Washington, University of—College of forestry. Catalogue, 1915-1916. 31 p. Seattle, Wash., 1915.

Forest Botany

Maiden, J. H. A critical revision of the genus Eucalyptus, pt. 22. 22p. pl. Sydney, Govt. printer, 1914.

Maiden, J. H. The forest flora of New South Wales, pt. 55. 33p. pl. Sydney, N. S. W., Govt. printer, 1914.

Silvics

Forest influences

Waters, Byron. Practical forestry in the San Bernardino Mts. 14 p. Riverside, Cal., Tri-counties reforestation committee, 1911.

Silviculture

Planting

Switzerland—L'inspection fédérale des forêts. Ausgerichtete bundesbeiträge an ausgeführte aufforstungsund verbauungsarbeiten im jahr 1914. 7 p. Bern, 1915.

Forest Protection

Insects

Britton, W. E. The gypsy moth. 24 p. il. New Haven, 1915. (Conn.—Agricultural experiment station. Bulletin 186.)

Burgess, A. F. Report on the gypsy moth work in New England. 32 p. il., pl., maps. Wash., D. C., 1915. (U. S.—Dept of agriculture. Bulletin 204.)

Essig, E. O. Injurious and beneficial insects of California. 2d ed. 541 p. Sacramento, California state commission of horticulture, 1915.

Diseases

Davey institute of tree surgery. Instruction books 13-14. il. Kent, O., 1914-15.

Weir, James R. Observations on the pathology of the jack pine. 10 p. il., pl Wash., D. C., 1915. (U. S.—Dept. of agriculture. Bulletin 212.)

Fire

Tri-counties reforestation committee. Forest fires on San Bernardino range; review of conflagration of summer of 1911, its cause and plans to meet similar emergencies. 23 p. Riverside, 1911.

Forest Economics

Campbell, R. H. The relation of forestry to the development of the country. 7 p. il. Ottawa, 1915. (Canada—Department of the interior—Forestry branch. Circular no. 11.)

Rothrock, J. T. Areas of desolation in Pennsylvania. 30 p. pl. Phila., Herbert Welsh, 1915.

Statistics

France—Ministère de l'agriculture—Direction des eaux et forêts. Statistique et atlas des forêts de France. v. 1-2. maps. Paris, 1912.

Forest Administration

National and state forests

Pettis, C. R. Resources of the forest preserve. 41 p. pl. Albany, N. Y., 1915. (N. Y.—Conservation commission.—Division of lands and forests. Bulletin 12.)

Forest Utilization

Lumber industry

Pratt, Merritt B. The deterioration of lumber; a preliminary study. 20 p. il. Berkeley, Cal., 1915. (California—Agricultural experiment station. Bulletin 252.)

Wood-using industries

Massachusetts—Bureau of statistics. Wages and hours of labor in the paper and wood pulp industry in Massachusetts. 157 p. Boston, 1915. (Labor bulletin no. 103.)

Mitchell, W. G. Treated wood-block paving. 40 p. il. Ottawa, 1915. (Canada—Dept. of the interior. Forestry branch. Bulletin 49.)

Teesdale, Clyde H. Experiments with wood paving blocks. 4 p. il. N. Y., 1915.

Wood preservation

American wood preservers' association. Proceedings of the 11th annual meeting, 1915., 527 p. pl., tables. Baltimore, Md., 1915.

Gould, Clark W. Quantity of wood preservatives consumed and amount of wood treated in the United States in 1914. 18 p. il. Baltimore, Md., American wood preservers' association, 1915.

Auxiliary Subjects

Conservation and natural resources

Adams, Frank D. The national domain in Canada and its proper conservation. 48 p. pl., maps. Ottawa, Canada, Commission of conservation. 1915.

Governors' conference. Proceedings of the 7th meeting. 306 p. Madison, Wis., 1914.

Hutton, George H. Water conservation by spreading on gravels. 11 p. Riverside, Cal., Tri-counties reforestation committee, 1914.

Pedley, W. E. Conservation of water by spreading on gravels. 11 p. il. Huntington Beach, Cal., Tri-counties reforestation committee, 1914.

Botany

Wilcox, E. Mead. A handbook of Nebraska grasses. 120 p. il. Lincoln, 1915. (Nebraska—Agricultural experiment station. Bulletin 148.)

Soils

Jones, J. S. & Colver, C. W. Soils of the cut-and burned-over areas of north Idaho. 20 p. il. Moscow, Id., 1915. (Idaho—Agricultural experiment station. Bulletin 81.)

Irrigation

United States—Reclamation service. Oregon cooperative work; Deschutes project, by the cooperating officers of the state of Oregon and the Reclamation service office at Portland, Oreg. 147 p. pl., diagr., maps. Portland, Oreg., 1914.

Grazing

Wooton, E. O. Factors affecting range management in New Mexico. 39 p. pl Wash., D. C., 1915. (U. S.—Dept. of agriculture. Bulletin 211.)

Periodical Articles

Miscellaneous periodicals

American journal of botany, Jan. 1915.—The temperature of leaves of Pinus in winter, by John H. Ehlers, p. 32-70.

American journal of botany, April, 1915.—The persistance of viable pycnospores of the chestnut blight fungus on normal bark below lesions, by R. A. Studhalter and F. D. Heald, p. 162-8.

Biltmorian, June, 1915.—Using the unemployed in forestry work, by Frank L. Haynes, p. 13-16; Volume tables for southern white cedar, by Howard R. Krinbill, p. 16-19; Creosoted wood paving block, by Hammond Robertson, p. 20-1.

Botanical gazette, May, 1915.—The medullary rays of cedrus, by M. A. Chrysler, p. 387-96.

Country life in America, June, 1915.—Junipers of the Sierras; photographers, by Charles T. Mott, p. 50-1.

Farm and fireside, May 22, 1915.—To make woodlots pay, by Edmund Secrest, p. 14.

Fire prevention news. May 1915.—Factors, of safety in wood construction, by James P. Whiskeman, p. 1-2; Lumbermen and fire prevention, by Frank H. Lathrop, p. 3; Fallacies of forest fire fighting, by Page S. Bunker, p. 3-4.

Gardeners' chronicle, May 1, 1915.—The vegetation of the coniferous wood, by George Brown, p. 229-30; Our trees, by W. Botting Hensley, p. 238.

Gardeners' chronicle, May 15, 1915.—Cupressus lusitanica var. benthamii, by A. Bruce Jackson, p. 259.

Harper's magazine, June 1915.—The last stand of the red-woods, Henry Seidel Canby, p. 46-58.

In the open, April, 1915.—The white pine; what it is, how to plant it, facts about its life and growth, by George H. Wirt, p. 25-9; The league fights forest fires, p. 33-5.

In the open, May, 1915.—White ash, by George H. Wirt, p. 26-9.

Journal of the Association of engineering societies, March, 1915.—Creosoting of cross ties as practiced by American rail roads, by A. C. Steinmayer, p. 110-20.

Journal of the New York botanic garden, March, 1915.—Dwarf evergreens, by George V. Nash, p. 47-61.

Journal of the Washington academy of science, May 19, 1915.—New or imperfectly known species of bull-horn acacias, by Wm. Edwin Safford, p. 355-60.

National wool grower, May, 1915.—"Blanket" system of handling sheep on the Madison national forest, by C. E. Fleming, p. 7-10; Forest and sheep, by D. Howe, p. 39-40.

Reclamation record, June, 1915.—Tree planting, Truckee-Carson project, p. 262-3.

Scientific American supplement, April 24, 1915.—Hour angle observation of polaris by daylight, by Robert V. R. Reynolds, p. 263.

United States.—Department of agriculture. Journal of agricultural research, May 15, 1915.—Wilt of gipsy-moth caterpillars, by R. W. Glaser, p. 101-28.

United States.—Dept. of agriculture. Weekly news letter, May 19, 1915.—Moth injures pine trees, p. 8.

United States—Dept. of agriculture. Weekly news letter, June 9, 1915.—Seventeen year locusts; brood 6 periodical cicada to appear in eastern states in May and June, p. 1-2.

United States—Dept. of agriculture. Year book, 1914.—The national forests and the farmer, by Henry S. Graves, p. 65-88; The farm woodlot problem, by Herbert A. Smith, p. 439-56.

United States—Weather bureau. Monthly weather review, March, 1915.—The influence of a western yellow pine forest on the accumulation and melting of snow, by Alexander J. Jaenicke, p. 115-26.

Wood preserving, April-June, 1915.—The Galesburg tie plant, p. 19-20; Development of demand for wood blocks, by R.S. Manley, p. 21-2; Piling and marking ties on the Pennsylvania R. R., p. 27-8; Wood block floor in the foundry, p. 31-2.

Trade journals and consular reports

American lumberman, May 15, 1915.—Damage from pin worms and the remedy, p. 22; Wood block's popularity expanding, p. 29; Uniform accounting for lumber producers, by John G. McIntosh, p. 47; Osage orange a good dyewood, p. 52; Starts ranger course; Georgia college will prepare men to be woods' bosses, p. 54.

American lumberman, May 22, 1915.—Engineer disagrees with new density rule, by Fred J. Hoxie, p. 25; Household uses of wood, by Joseph B. Knapp, p. 47-8.

American lumberman, May 29, 1915.—Correct way to tax lumber; Seattle concern claims plan will overcome many evils if properly used, p. 45; Increasing the exportation of Douglas fir, p. 52-3; Boosting creosoted wood flooring and paving, p. 55.

American lumberman, June 5, 1915.—Kiln drying common lumber, by C. C. Bronson, p. 45; Use of electricity in logging and lumbering, by W. E. Herring, p. 48.

Canada lumberman, May 15, 1915.—The lumber industry of central British Columbia, by F. S. Wright, p. 36-8.

Canada lumberman, June 1, 1915.—The export trade of Canada in wood goods, by Edward Harper Wade and others, p. 86-7, 100-10, 116-24; European markets and trade customs, by A. E. Trotman, p. 96-8; Great Britain's consumption of timber, p. 112-14.

Electric railway journal, April 3, 1915.—Tie treating on the Boston and Worcester street railway, p. 678-9.

Electrical record, March, 1915.—Some uses for wood in the electrical industry, p. 55-7.

Engineering record, March 6, 1915.—Wood block replaces plank as steel bridge flooring, by Edward Stingel, p. 300.

Engineering record, March 20, 1915.—Economic considerations justify wood-stave pipe for water-power penstocks, by Robert E. Horton, p. 356-8.

Engineering record, April 24, 1915.—Forest service suspension bridges in Pacific northwest, p. 529.

Hardwood record, May 25, 1915.—Man and nature as tree planters, p. 15; An efficient spark arrester, p. 30; Tree dyes of the United States, p. 22.

Lumber world review, May 25, 1915.—What is the matter with the lumber industry, p. 24-7.

Lumber world review, June 10, 1915.—What is the matter with the lumber industry, by Carleton H. Parker, p. 23-5; Service is what the lumber consumer wants, by E. A. Sterling, p. 26-7; Portable timber-felling machines for India, by Henry D. Baker, p. 27.

Mississippi Valley lumberman, May 28, 1915.—The government study of the forest industry, by Austin Cary, p. 39-40.

Mississippi Valley lumberman, June 4, 1915.—A Canadian view of the future of lumbering, by H. R. MacMillan, p. 37-8.

Municipal journal, June 3, 1915.—Absorption test for wood blocks, by George W. Tillson, p. 776-7; Sand cushion vs. mortar bed for wood block pavements, by Theodor S. Oxholm, p. 777.

Pacific builder and engineer, May 15, 1915.—Creosoted and untreated piling on Pacific Coast, by H. E. Horrocks, p. 207-8.

Paper, May 19, 1915.—New steam-soda process for wood, p. 14-15.

Paper, May 26, 1915.—Causes of defects in sulphite cellulose, by R. R. Oliver, p. 11; Industrial resources of the south, by Arthur D. Little, p. 12-16, 38.

Paper, June 2, 1915.—Great Britain's resources in paper material, p. 13-14.

Paper, June 9, 1915.—Canada's woodpulp production p. 11-13.

Paper trade journal, May 20, 1915.—Ontario's forest resources, by Julius D. Dreher, p. 38.

Paper trade journal, June 3, 1915.—National homemaking, by C. J. Blanchard, p. 46-52.

Pioneer western lumberman, May 15, 1915.—Lumber supply of the United States; comparison of competitive and non-competitive Pacific Coast species, p. 3-4; Some specific information about yellow pine, by G. A. Buell, p. 25; Approved method for laying wood block paving, p. 28.

Pioneer western lumberman, June 1, 1915.—Wood block paving for bridges, p. 6; Greenheart an unusual wood, p. 7.

Pulp and paper magazine, May 1, 1915.—Forestry and paper making, by Thos. J. Keenan, p. 267-9.

Pulp and paper magazine, May 15, 1915.—Measuring the moisture in cellulose, by Otto Nordstrom, p. 290-2; Courses of instruction in paper making in British technological institute, p. 293-7; Manufacture of aniline colors in the United States, by I. F. Stone, p. 298-300.

St. Louis lumberman, June 1, 1915.—Address delivered before the 6th annual meeting of the Louisiana forestry association, May 7, 1915, by Henry E. Hardtner, p. 66-7.

Savannah naval stores review, May 15, 1915.—Could the pine tree stand the bleeding strain? p. 3-4.

Timber trade journal, May 15, 1915.—The forests of Russia, p. 967.

Timber trade journal, May 22, 1915.—Incense cedar for pencil manufacture, p. 998.

Timberman, May, 1915.—Efficiency in logging, by W. W. Peed, p. 25-6; Uses for sugar and white pine, by George X. Wendling, p. 27-8; Wood block pavement, by N. E. Ayer, p. 40; Valuable qualities of Montana larch, by A. G. Naundorf, p. 42; Idaho logging flume, p. 48 B-C.

United States daily consular report, May 19, 1915.—Canadian lumber for United States, by R. M. Newcomb, p. 810.

United States daily consular report, May 22, 1915.—Wood dishes in Uruguay, by Herman L. Spahr, p. 859.

United States daily consular report, May 27, 1915.—Market for box shooks in Andalusia, by Wilbur T. Gracey, p. 924-5.

United States daily consular report, May 28, 1915.—Substitutes for Swedish pine in Brazil, by R. E. Simmons, p. 938-9.

United States daily consular report, June 12, 1915.—Reforestation of lighthouse reservations, p. 1153; Foreign markets for artificial limbs, by Albert Halstead and others, p. 1154-58.

United States daily consular report, June 14, 1915.—Forestry and timber in Ireland, by Wesley Frost, p. 1192-6.

Veneers, June, 1915.—Some information about mahogany, by H. W. M., p. 13-14.

West Coast lumberman, May 15, 1915.—Logged-off land, by Harry Thompson, p. 33.

West Coast lumberman, June 1, 1915.—Use of engines in land clearing, by Harry Thompson, p. 39; Exporting North Borneo timber, p. 44.

Wood turning, June, 1915.—Turning balls and knobs, by Jas. F. Hobart, p. 5-6; Utilization in handle making, p. 11.

Forest journals

Allgemeine forst- und jagd-zeitung, Dec. 1914.—Neuere erfahrungen auf dem gebiete der erforschung und bekampfung der nonne, by Baader, p. 361-9; Ueber zusammenlegungen und forsteinrichtung, by Hemmann, p. 369-73.

Canadian forestry journal, May, 1915.—How Switzerland cuts the tax-rate by forest harvesting, by Marie Widmer, p. 66; What Newfoundland does to safeguard her forests, by P. T. McGrath, p. 67.

Forest and farm, May, 1915.—The farmer's wood lot, by S. T. Dana, p. 71-3; Teaching forestry in the woods, by Charles A. Whittle, p. 73-4.

Forest leaves, June, 1915.—Value of forests in reducing floods, by C. P. Birkinbine p. 38-9; A unique pine and spruce planting by James F. Walker, p. 39-40; Jamaica views, by J. T. Rothrock, p. 40; Pennsylvania forestry legislation, p. 43-4; Some tree insect pests, p. 45-6.

Forestry quarterly, June, 1915.—The forestry situation in Great Britain, by B. E. Fernow, p. 149-53; Normal forest and actual forest; normal growing stock and actual growing stock; normal stand and actual stand, by Filibert Roth, p. 154-62; Further notes on the effect of exposure on white pine seedlings, by E. A. Ziegler, p. 163-70; The management of lodgepole pine, by D. T. Mason, p. 171-82; The subdivision of forests, by J. S. Illick, p. 183-98; Small sale costs on the Apache forest, by Clifford W. McKibbin, p. 199-207; The woodlot problem, by Bristow Adams, p. 208-14; John Muir; and appreciation, by J. D. Guthrie, p. 215-17.

Forstwissenschaftliches centralblatt, March, 1915.—Das verhalten des holzes gegen eisen, by P. Rohland, p. 109-12; Ueber die bekämpfung des grossen braunen rüsselkäfers, by Franz Scheidter, p. 113-25; Stickstoffdüngungsversuche mit 2 und 4 jährigen fichten und deren wachstumsergebmisse nach der verpflanzung ins freie, by Siefert and Helbig, p. 126-39.

Forstwissenschaftliches centralblatt, April, 1915.—Schafzucht und waldwirtschaft, by H. Hausrath, p. 152-60; Zur reform der deutschen forstentomologie, by K. Escherich, p. 161-71; Ueber holzmassenschätzung für zwecke der waldertragsregelung, by Schubert, p. 171-6; Ueber die bedeutung der kameralistischen und der doppelten buchführung in der forstlichen verrechnung, by K. Katzer, p. 176-87.

Indian forester, April, 1915.—The uniform system in Burma, by H. C. Walker, p. 105-11; Twisted fibres in chir pine, by F. Canning, p. 112-16; A further note on the oil-value of some sandal-woods from Madras, by Puran Singh, p. 123-31.

Naturwissenschaftliche zeitschrift für forst- und land-wirtschaft, Jan. 1915.—Die eichenmehltau, Microsphaera alni, var. quercina, by F. W. Neger, p. 1-30; Eine epiphyllische Ulothrix, by A. Eckley Lechmere, p. 30-41; Ueber die keimung einiger baum- und gehölzsamen, by Wilhelm Kinzel, p. 129-59.

Naturwissenschaftliche zeitschrift für forst- und land-wirtschaft, April-May, 1915.—Untersuchungen über verzögerte keimung, by Puchner, p. 159-78; Holzzerstörende krebse, by Friedrich Moll, p. 178-207.

Revue des eaux et forêts, April 1, 1915.—L'age des bois et le traitement des forêts, p. 582-96.

Schweizerische zeitschrift für forstwesen, Dec. 1914.—Weisserle und Tessinkorrektion, by F. Aubert, p. 307-14; Verbau einer rüfe im Jura, p. 314-19; Forstliche studienreise nach Thüringen im Juni 1913, by E. Meyer, p. 320-24; Eidgenossisches forst- und landwirtschaftliches institut, p. 325-6; Der Alpwald, by Merz, p. 327-36.

Schweizerische zeitschrift für forstwesen, Jan.-Feb., 1915.—Die förderung des plenterwaldes, p. 4-9; Exkursion in die waldungen des Spessart, 12. Juni 1913, by M. Conrad, p. 9-13; Beitrag zu den fragen der ertragsregelung mit besonderer berücksichtigung des schlagweisen hochwaldbetriebes, by F. Gascard, p. 13-24; Sturmschaden in den waldungen der gemeinde Grabs, by R. Rietmann, p. 24-6.

Schweizerische zeitschrift für forstwesen, Mar.-April, 1915.—Einiges über forsteinrichtung, by Neuhaus, p. 41-4; Nochmals "Die forderung des plenterwaldes, by F. Fankhauser, p. 44-9; Rückblick auf die entwicklung des schweizerischen forstwesens, p. 50-3; Die witterung des jahres 1914 in der Schweiz, by R. Billwiller, p. 57-67.

Skogen, Feb. 1915.—Barkning av massaved; en fråga av nationalekonomisk betydelse (The barking of pulpwood; a question of national economic importance), by Isaac Ljunqvist, p. 33-42; Om renens användning i skogsbrukets tjänst (Regarding the use of elk in lumbering), by Einar J. Berggren, p. 43-9; 1914 års travarumarknad (Pulp market in 1914), p. 50-4.

Skogen, March, 1915.—Nagra ord om virkets försagning, hyvling ock lagring (A few words concerning the sawing, planing and storage of lumber), by Magnus Nordquist, p. 57-71; Nagot om fröträd (Concerning seed trees), by Ake Joachimsson, p. 72-3.

Skogen, April, 1915.—Skötsel av plantskolor (The care of tree nurseries), by Th. Grinndal, p. 81-104; Om utbuskning av vägar (Marking roads by means of bushes), by Ake Joachimsson, p. 105-7; Om granens s. k. skottfällning och orsaken härtill (Regarding the falling of pine-spruce cones and its causes), by Edvard Wibeck, p. 108-11.

Skogen, May, 1915.—Tallskytte och snöskytte (Pine fungus and snow fungus), byTorsten Lagerberg, p. 117-26; Blixtens forhallande till olika trädslag (The relation of lightning to various tree species), by Henrik Hesselman, p. 127-35; Flottningskanalen vid Mora (The driving canal at Mora), by Erik Geete, p. 136-40; De insektätande faglarnas betydelse for skogshushållningen (The importance of insect eating birds in relation to forest management), by Ivar Trägårdh, p. 140-8.

Skogsvårdsföreningens tidskrift, March, 1915.—Taxeringen av Värmlands läns skogar och förslaget till en texering av landets samtliga skogar (Estimate of Värmlands county forests, and suggestions for an estimate of all the country's forests), by Henrik Hesselman, p. 193-232; Lappmarkens utsyningslag (Some observations on Lapland's surveying law), by Einar Hammarstrand, p. 233-42; Barrträdskvalstret, Paratetranychus ununguis (The coniferous insect, Paratetranychus ununguis),, by Ivar Trägårdh, p. 243-6; Skogsbrandsfrågan (The forest fire question), by Otto Hellström, p. 246-8.

Skogsvårdsföreningens tidskrift, April, 1915.—Några tankar med anledning av domänstyrelsens utlåtande rörande statsrevisorernas uttalanden om hushållningen å statens skogar (A few thoughts with reference to the forest administration's utterances concerning the statements of the commissioners of audit regarding the care of the state forests), by Nils G. Ringstrand, p. 329-51; Synpunkter rörande Lappmarkens utsyningslag (Observations concerning Lapland's surveying law), by Frans Kempe, p. 352-5; Försäkringsinspektionens förslag till obligatorisk skogsbrandförsäkring i statsanstalt (Suggestion of the insurance inspection commission regarding compulsory forest fire insurance for state property), p. 356-67; Norskt skogsbruk sådant det framträdde å jubileumsutställningen 1914 (Norwegian forestry as exhibited at the Centenary exposition, 1914), by Erik Hedemann-Gade, p. 368-90.

Tidsskrift for skogbruk, April 1915.—Statens skogjop (Purchase of forests by the state) by Agnar Barth, p. 125-35; Snaasen Grong og Lierne (Conditions in Snaasen, Grong og Lierne), p. 137-9; Om vort lands skogdannende former av alm gran (Picea excelsa) og disses storre og mindre vaerdi som skogstraer (Concerning our country's forest forms of Norway spruce and their value as forest trees), by B. Hansteen Cranner, p. 140-58; Produktion av skogfr (Extraction of forest seed), by O. P. Moe, p. 159-65; Nordlandsloven (The Nordland law), by Henrik Jelstrup, p. 165-7.

Zeitschrift für forst- und jagdwesen, Jan, 1915.—Karl Fricke, by Alfred Möller, p. 1-8; zur bekämpfung des kienzopfes, by Schultz, p. 8-29; Aufforstung von ödländereien, by Krause, p. 29-46.